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A NEW NATURAL THEOLOGY



A NEW  
NATURAL THEOLOGY

BASED UPON

*The Doctrine of Evolution*

BY

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TO

THE REV. WILLIAM SANDAY, D.D., LL.D.

*Lady Margaret Professor of Divinity, and Canon of Christ Church, Oxford ;  
Formerly Principal of Bishop Hatfield's Hall, Durham.*

DEAR DR. SANDAY,

My attention to the subject of Natural Theology has been chiefly due to the encouragement I received from you, when many years ago, after a sermon preached in the Chapel of Bishop Hatfield's Hall, you expressed a desire to hear more from me on the subject of Darwinism in relation to Theology. And the unfailing sympathy and kindness you have shown towards me throughout the years in which, amid many distractions, this work has slowly grown and reached completion—in how imperfect a form I am only too conscious—moves me to ask you to permit your name to be associated with it, and to accept it from me as an expression of my gratitude.

I have also to thank you, and Dr. Robertson, your successor at Durham, for the cheerful readiness with which, under the pressure of other engagements, you undertook to read the proof sheets ; and for the many valuable suggestions which you and Dr. Robertson have made.

I am, yours very truly,

J. MORRIS.

ST. ANDREW'S DAY, 1895.



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But he never enters into the spirit of the evolution teaching ; and only after he has thrown down the gauntlet does he condescend to notice it. This vitiates his whole procedure.

The same false view of the facts of the case also runs through and colours his consideration of the objections to the Divine Wisdom, Goodness, and Benevolence.

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- Provided that we can come into view of the conditions of evolution, precision in the view of facts is not material.
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- The question of origins is strictly a philosophical question, and not an interpretative one.
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This law is to be carefully distinguished from the secondary laws of the evolution processes.

The law of the evolution determines the scope and tendency of the evolution.

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| <p>Pleasures and pains, instincts and intelligences, do not in the lower animals transcend the horizon of present experiences.</p> <p>Yet the survival of the fittest has been so far associated with mental qualities that there has been a continuous rise in the order of mental manifestations.</p> <p>And man, through his mental endowments, reigns, to some extent, in the place of natural selection.</p>   |         |
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If our sympathetic motions be true, the order of evolution must be adequate to fulfil the demands our sympathies make upon it.

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The intuitional judgments and instinctive feelings and habits pertaining to the mental order.

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All intuitions, instinctive feelings, and moral sentiments depend on fixed relations; and we purpose to determine whether the sphere of the fixed relations of our higher manifestations of mind, and the law pertaining thereto, be independent of the physical order.

The question of the criteria to apply.

Criticism of Bishop Butler's view of infinity.

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## CHAPTER I.

### INTRODUCTION

#### § 1. *Religion and Science.*

ALL true religion sees God everywhere and in all things. And whether the truths of religion be revealed truths, or such as are native to the religious faculty, they must also be truths manifest in letters of fire on the midnight sky, and in everything that rejoices in the light of the sun. A cold, dogmatic creed, to which Nature bears no witness, cannot be Divine; and the idea of God, into which there enters no element derived from the religious significance of outward things, is but the unfertilized fruit of a visionary mysticism.

Intuitive in its knowledge of the existence of God, religion insists on interpreting all things in terms of God. And, projecting its activity into Nature, it gives, in every age, a religious significance to the universe, which, however misplaced or imperfect, has at all times been an important factor in the realization of the presence of God. Men of old saw God in the thunderstorm, and felt the awe of His Presence before the mountains; a later age, less crude in its conceptions, but full of anthropomorphic ideas of the Deity, beheld His direct handiwork in the disposition of natural phenomena and in the ordering of human events; and, in our own day, a more philosophical attitude of mind has persistently cherished the thought of God's Power and Love, as exemplified in an orderly and beneficent plan of creation.

But this projection of the religious activity into Nature does not take place without, at times, provoking a sharp and bitter conflict between the religious and the scientific view of things.

Our religious views of the universe are founded upon a religious view of scientific truths; and although the scientific spirit is not, in itself, opposed to the religious intuitions, and does not question the religious truth that Nature is of God, it yet frequently calls into question the validity of the religious inferences with regard to the ways of God. In our religious views of the universe the territory of established scientific truths is fenced round with the doctrine of a final cause, and the scientific conceptions of the age are fettered with theological dogmas. But the scientific spirit disdains these limitations and bonds, and, in its search for knowledge, perpetually impels the mind to advance beyond the region of assured truths, and to engage in hypotheses and speculations which do pioneer work in reducing tracts of the unknown. And thus while religion would give fixity to our conceptions of the universe, science is continually widening and re-shaping them, and, in the progress of knowledge, epochs inevitably arise when the change in our scientific conceptions imperatively demands a re-adjustment of the religious boundaries, and a removal of the theological bonds. The religious mind, however, is disinclined to undertake these tasks, and consequently provokes the opposition of science. As old conceptions of the universe give place to new, the familiar landmarks by which Nature has been taken to bear witness to the Divine, become no longer discernible; and in place of what it had previously accepted as true, religion finds strange truths pressed upon its attention. It is called upon to abandon old lines of thought, and to seek to discover new. Traditional beliefs are disturbed, and cherished convictions endangered. But convictions with regard to God, which have once become established, can never, without violence, be wrenched from the mind. The unsettling of an old conviction frequently leaves no throne upon which a new one can establish itself. And the expulsion from the mind of false ideas associated with religion, often leads to an avowed scepticism or atheism. Many religious minds, therefore, at such times of reconstruction, shrink from permitting the new and strange truths to operate on their beliefs, and many more

by a kind of intellectual polarity, fly away from them as far as they can, and take up a position of unreasoning antagonism, and a conflict with science ensues.

But no one who aspires to truth, above all things, can be excused in refusing a welcome to whatever is true; and whenever things, learned and treasured as true, can no longer be accepted as true, the task of unlearning them, however painful and discomposing, must be undertaken. For these conflicts, therefore, the religious mind must be held to be ultimately responsible, notwithstanding that, as a matter of fact, its attitude is, in general, amply excusable as a wise conservatism against the undue development of speculative views of the universe, and, occasionally, more than excusable as a righteous protest against hypotheses that, with just the faintest colouring of probability, are made use of to attack theological opinions.

It is inevitable that, as knowledge increases, unprogressive religious thought will find itself in opposition to scientific teaching. But no religious thought can afford to be unprogressive. And the proper attitude of the religious mind ought to be one which recognises that the exercise of the religious activity, in the domain of Nature, is, in the first place, to be accompanied by an enlightened understanding, and, in the second place, to be governed always by the clear recognition of the truth that, until our knowledge of the universe is sufficiently extended to secure, that we do not, without suspecting our ignorance, reason on matters of which we are ignorant, inaccurate ideas and false conceptions will assuredly arise, which an advance of knowledge can alone correct.

And the religious mind need not fear to adopt this attitude. On every real advance of knowledge we attain more correct conceptions of the universe, and form truer ideas of its relationship to the Divine. And, hitherto, as our conceptions of the universe have changed, the fundamental truths of religion have always been able to vindicate themselves, if not at once, at least when the period of perturbation had passed away, and thought had become calm and sober. In



the age which followed the dawn of the physical sciences, the re-adjustment that took place among the generally received conceptions of the universe was of the most violent kind: from a view of the universe in which the mind had run riot in its fancies, and endowed space with what shapes it pleased, without a suspicion that it was creating an ideal world, and peopling it ideally, man was recalled to the region of facts and trained and tutored into the acceptance of new and juster conceptions of things; and, with the formation of these new conceptions, his religious convictions, owing to his inability to distinguish between what was religion and what were the excrescences of the religious fancy, were profoundly affected; but the time of conflict passed over, the essential elements of religion re-asserted their validity, and a wiser reading of the religious significance of Nature grew up out of the new conceptions that had become necessary. And this, the teaching of the age which followed the dawn of science, is also the general teaching of the past, and we ought to have confidence that, in the progress of knowledge, no beliefs can be permanently swept away, other than those which are superstitious and false.

Nor ought it to be difficult for the religious mind to accept this position, and hold its religious conceptions of the universe subject to modification by increase of knowledge. The witness of Nature to the God of Nature is not the basis of the ultimate religious ideas; nor are the beliefs held with respect to the relationship of Nature to God themselves the source of belief in God. The foundation of religion is in the sentiment which moves the human personality outside of itself unto the recognition of God;<sup>1</sup> and the belief in God, without which there can be no religion, is not to be confused with the belief in particular modes of manifestation of God, which is mainly, if not wholly, dependent upon our inferences with regard to the things of God. Belief in God can never be surrendered by the religious mind; but belief in particular modes of manifestation of God may be surrendered as occasion

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<sup>1</sup> See chapter ix. §§ 2 and 4.



demands, without danger to the essentials of religious belief. And only if some new conception of Nature be held, not merely to negative the previous mode of apprehending the ways of God, but also to cast suspicion on the reality of His existence, can the conflict between religion and science possibly assume the form of a chronic antagonism.

§ 2. *Herbert Spencer's Claim to have reconciled Religion and Science.*

It is maintained, however, by Mr. Herbert Spencer, that though religion has its foundation in a true view of the universe, it can give no satisfactory interpretation of the relationship of the universe to God.

Spencer sees in the conflicts between religion and science "the oldest, the widest, the most profound, and most important" of all the antagonisms of belief by which men are divided. And assuming, in accordance with his general principle of "the soul of truth in things erroneous," that all antagonisms of belief have, at their root, some common truth, he searches diligently for the truth which shall harmonize this most important of antagonisms.

This truth, he concludes, must, from the nature of the case, "be the ultimate fact of our intelligence." Which ultimate fact is equally present, though in different forms, to both religious and scientific thought. To religion it presents itself in the form that, from the moment when self-consciousness is mature within a man, there begins a mystery which continues to be a mystery while the man lives and thinks. And, in reference to science, it compels the recognition that, beyond the definite consciousness of the relations of things, the human mind possesses an indefinite consciousness of something which transcends all relations; and that the relative, or conditioned, which constitutes the sphere of experience, is inconceivable, "except as related to a real non-relative," or absolute. In this truth, Spencer holds, the two spheres of thought find their harmony. And to religion he accords the merit of having, from the first, dimly discerned the truth, and

always insisted upon it as a mystery. But he maintains that religion cannot solve the mystery, and that all attempts to solve it are futile. Though present to thought, it is unthinkable, and the basis of the reconciliation of religion and science, he says, "must be this deepest, widest, and most certain of all facts—that the Power which the universe manifests to us is utterly inscrutable."<sup>1</sup>

We shall, in due time and place, discuss the philosophical view of things on which this reconciliation is based,<sup>2</sup> and, for the present, we are content to point out that, whatever be its philosophical merits, it fails to take a due account of the religious activity. It is always easy to effect a reconciliation between opposing principles, when one of the opposed principles is robbed of all that gives it vitality and strength. And even a cursory reading of what Spencer says about religion is sufficient to disclose that he takes away from it its most distinctive and characteristic features, and leaves only those sides of it which come into contact with scientific theory and philosophical speculation. He enquires into the ultimate religious ideas, and finds them to be concerned only with a theory of universal causation. He examines the constituents of religious creeds, and concludes, that while all others disappear, this one verity remains, "that the existence of the world, with all that it contains, and all which surrounds it, is a mystery ever pressing for interpretation."<sup>3</sup> But he never reflects that there can be no religion where there is no God. Nor does he perceive that from the crucible, in which he compounds the systems of religion, he suffers the true essence of religion to sublimate away unperceived, and picks up only the dry bones of a religious philosophy. These dry bones he sets before the world as the ultimate constituents of all religion, and is never troubled by the thought that the philosophical framework of religion is not the substance of it, but merely that which gives shape and form to the religion, which in itself is the cry of the human

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<sup>1</sup> *First Principles*, p. 46.

<sup>2</sup> See Appendix, §§ 2 and 3.

<sup>3</sup> *First Principles*, p. 44.

heart to the Almighty, "*Fecisti nos ad Te, et iniquum est cor nostrum, donec requiescat in Te.*"

He concedes to religion, indeed, a foundation in the sense of a mystery which must always exist; but he denies to it the power of finding secure and lasting materials out of which to erect its fabric of faith. "Every religion," he says, "setting out as it does with the tacit assertion of a mystery, forthwith proceeds to give some solution of this mystery, and so asserts that it is not a mystery passing human comprehension. But an examination of the solutions they severally propound shows them to be uniformly invalid."<sup>1</sup> Thus religion is only permitted to speak ecstasically in an unknown tongue, and whenever it ventures to speak in the tongues of men it is regarded as ceasing perforce to be inspired; and while there is granted the possibility of religious belief, all truly religious beliefs are made impossible.

But Spencer's view of definite and knowable truth, apart from the truths which he postulates as first principles, begins and ends with truths which admit of scientific demonstration; and his judgment of what are religious truths proceeds, altogether, on the assumption that the criterion of scientific truth is also the criterion of religious truth. Whatever religion has to say about the universe, he requires it to be said, not in accordance with the religious, but in accordance with the scientific, conception of things. And he appears to have no idea that if a truth be a religious truth it ought to be judged according to the religious way of looking at things, and not the scientific. Even when, in enunciating the most ultimate of his first principles, he assumes religion to reach out towards a truth which it can never apprehend, the truth, as he states it, is stated not from the religious, but from the scientific standpoint. It is science, and not religion, which clothes "the power which the universe manifests to us" with the attributes of a mystery. It is science, and science alone, which runs its head against the fact that there is more in the universe than the relative truths of the inductive sciences.

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<sup>1</sup> *First Principles*, p. 45.

Whatever mysteries exist in the universe, they exist as such, not to religious but to scientific thought. And all that Spencer does in his portraiture of religion is to surround the cold and passionless features of science with the halo of metaphysical speculation, and write beneath the picture the sacred name of religion. Religion is to him nothing more than the obstinate questioning of a spirit dissatisfied with the things of sense. He takes no account of the purely religious sentiment which is natural to mankind. And, denying to religion any other sphere of attaining truth than that which is an encroachment on the scientific, and which must be yielded at the demand of science authorized by increase of knowledge, instead of allaying the conflict between religion and science, he intensifies it by leaving to religion, in its endeavour to escape from agnosticism, no alternative but to place itself in chronic antagonism to science.

### § 3. *The Position of the Christian Church.*

No religion can tolerate agnosticism, and with views such as Spencer's, the Christian Church, in particular, at once joins issue. The Christian holds that his religion is not a philosophy of the universe, but a revelation from God. He is ready to admit that all other religions are more or less the products of human thought; but his own religion is to him based upon historical fact; and, as such, he counts it as worthy of acceptance as any induction from observed facts, and far more worthy than any ingenious speculation as to the verity of things. Moreover, it does not stand isolated in his mind as connected with a single group of facts which took place when its Founder was on earth. He holds it to be a religion to which events were working ages before Jesus appeared upon the stage of human history. The Fall of Man was its prehistoric groundwork; the Call of Abraham marked its entrance upon the historic stage; the national life of the chosen people was the medium of its development; prophets distinctly enunciated what the end was to be; in the fulness of time the Christ was born, was crucified, and rose from the dead; and the risen Saviour, completing the revelation of God in

history, founded His Church to be the witness of His resurrection, and ascended to the Father, with Him to remain, until, in the fulness of time, He again manifests Himself to the world. This is the ground the Christian takes up; and it is open for him to maintain that before his religion can be reduced to the level of a speculative philosophy, its historical character must be effectually disproven. Indeed, if Christianity be established on the firm basis of historical fact, no hypothesis of the nature of religion which disregards its claims can be true.

If, however, the Christian take up this ground, and be content to marshal the evidences of his religion, and present them in a form in which they can be gainsaid by no one, he must also be content to give up all claim to interpret the universe and construct a natural theology. But the idea he entertains of God forbids him to do this. The idea of God which he derives from revelation is that of a God who is the Creator of the universe, and the Father of the race of man; and, if no support for this idea were to be found in what is known of the universe and of the position of man, there would be lost to the Christian his sense of the nearness of God. God would be no longer discernible in His works, and the belief in His overruling Providence would become a matter of unreasoning faith, and rapidly degenerate into a cold and lifeless conception. His power and love would be shrouded from sight, and the religious activity of the soul become warped and deadened. The intensity with which the Christian holds to the nearness of God demands that God should be seen in Nature as well as revealed in history. The Bible and Nature are alike God's books; and the ideas of God derived from each are complementary, the one to the other, and both are needed to give full life and vigour to the Christian conception of God.

The Christian must have a natural theology.

#### § 4. *The Impossibility of a Pure Agnosticism.*

A robust Christianity thus not only refuses to accept the view which Spencer takes of religion, but also, by laying claim to a natural theology, boldly calls into question the legitimacy



of the reasoning which would exclude, as futile, all attempts to interpret the universe.

Of course, if the religious interpretations of the universe, depending, as they do, on the doctrine of final causes, are to be tested by the scientific method, and approved of as scientific theories or hypotheses, they cannot, for a moment, be upheld. But to require this test is to lose sight of the distinctive import of all reasoning with regard to final causes. Final causes are, as Bacon says, "*plane ex natura hominis, potius quam universi.*"<sup>1</sup> They depend upon our conceptions of things, rather than on the nature of the things themselves. And though they are inadmissible as scientific theories or hypotheses, and worthless, if not harmful, when intruded into scientific investigations, yet with respect to the interpretation of the universe, so far from being inadmissible or leading to futile conclusions, no one can escape from some conviction or other involving the validity of the doctrine of final causes, and each age is bound to give such a solution as it can of the questions they suggest. The universe presents to us problems which must be answered; and scientific truth carries us but a little way in the determination of many questions, to which each of us must give solutions, however rough and ready, every day of our lives. We stand on the earth, thinking things amid the things of thought; and while we slowly build up our knowledge of outward things by the methods of observation and experiment, we are, at the same time, compelled to interpret the presentation of the universe to ourselves. We watch the change of energy from form to form, and trace out the great mechanic law which binds the worlds in one; we mark the marvels of organic life, and unfold the wondrous order of the universe; but, in addition to these exercises of thought, and immeasurably more important to ourselves, are our thoughts of our own position in the universe, and the regulation of our conduct thereby. Some interpretation of the universe we must have; some determination of the nature of our own being must be accepted. And there exists no man

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<sup>1</sup> *Novum Organum*, Lib. i. 48.

but who has positive beliefs, both with regard to the final cause of the universe, and his own place within it.

We are conscious, indeed, that in the exercise of our interpretative powers we are exposed to various possibilities of error. Our view of the universe is always in accordance with the state of our knowledge respecting the universe, and liable, therefore, to modification from increase of knowledge; and our deliverances with regard to ourselves are often influenced by preconceptions which prevent us from arriving at truth. But these and other possibilities of error, though they may make us distrustful of the beliefs of other men, have no influence in making any one of us permanently distrustful of his own beliefs. In everything wherein we are raised above the plane of animal life, beliefs of one form or another are implied, which involve a view of the final cause of things. And these beliefs constitute themselves the basis of all belief. We may change them, but we cannot be without them; and, if doubts arise with regard to them, these are always transitory, and mark merely the passage from one belief to another, or a disturbance that leads to the deepening of the original one.

The possession of a reflective mind makes belief in final causes a necessity. We may have a belief, or we may have no belief, with regard to the testimony of certain witnesses to certain facts which lie outside common experiences; but this alternative is impossible to us with regard to the interpretation of the universe and our own place within it. Here the choice is not between belief and no belief, but between one form of belief and another; and, though we may realize that like streaks of morning cloud we shall all have melted into the infinite azure of the past, before the noontide of a perfect belief is attained, we are all, nevertheless, constrained to entertain some belief or other. Even those who deny the power of the human mind to know anything of the final cause of the universe, and who reject all evidences of the manifestation of God, are able to do so only by virtue of the interpretation they have already given to the universe, and to the sphere of the human understanding as exercised therein. They profess to reject all interpretations of the

universe, on the ground that any interpretation of it involves conceptions with regard to a matter on which no definite conceptions are possible; but the very conclusion that on this matter no definite conceptions are possible, is itself due to the interpretative power of the mind deciding for itself that its place in the universe is such that it has no interpretative power. And this decision really carries with it an interpretation of the universe of a very definite kind. Making a distinction between the knowable and the unknowable, it interprets the universe wholly in terms of what is conceived to be the knowable; and arbitrarily rules out of court all question, whether what is regarded as unknowable, has, or has not, relations to the self-conscious beings in the universe, which are of practical importance to them in the conduct of life.

The truth is, the agnostic assents to a particular view of the human understanding, and this, a purely speculative belief, he insists upon projecting into the practical affairs of life. But, whatever view he takes of the understanding, he cannot rid himself of his position as a self-conscious being; and must in his life manifest a creed of some sort. If he acts on the supposition that the unknowable has no direct relation to him, as he appears to be logically bound to do, he practically accepts the creed of atheism. And if, on the other hand, he acts on the supposition that it has a direct relation to him, for men are not always logical in the practical conduct of life, he virtually assents to a creed of theism. He cannot sit upon the fence and dream away his existence; nor can he in any moment of lucidity think that such an attitude is a satisfactory one for any man, and worthy of acceptance by the human race.

### § 5. *The Place of Natural Theology.*

Pure agnosticism is impossible. The agnostic stands, indeed, like the atheist upon an arid plain; but before him arises a mighty sphinx, too colossal not to shut out all that lies beyond it, yet, nevertheless, suggestive of a temple most magnificent; and no silting up of the desert sands can ever hide its vast proportions, and permit him to be indifferent to religious



beliefs. The doctrine of the unknowable is virtually a confession of the existence of God. All that the agnostic denies is our power to know God, and, whatever force there is in this denial, it is such as is derived, as we shall hereafter see,<sup>1</sup> more from the character of certain difficulties which present themselves than from any inherent incapacity of the human understanding to know of God.

Our self-conscious being demands, as we have said, an interpretation of the universe. And we may meet every objection to the possibility of interpreting the universe, with the statement that natural theology deals with a question of practical moment to the conduct of life. It is a popular, but mistaken, notion, that a natural theology is an argumentative appeal addressed to those who disbelieve in a personal God. It has, undoubtedly, a use and value as such; but its chief value and true use is to interpret to man the spiritual significance of the universe; and to deny its power to interpret is practically to commit suicide of spiritual being.

Natural theology makes no pretension to the possession of apodictical truth. On the contrary, though it asserts itself to be the interpretative science of the universe, and has for its object to specify the relationship of the universe to God, it professes to be interpretative, and to attain its object only so far as it is permitted to do so by what is known of the universe. And, as the interpretative science of the universe, it occupies a distinct domain of its own, separated by clear boundaries from philosophy on the one side, and from the inductive sciences on the other. Its province is neither that of a philosophy which seeks to determine the ultimate nature of things, nor that of an inductive science which concerns itself with the building up of knowledge from the observation of facts, but that of a theology which inquires into the modes of the manifestation of God. And in reference to the universe its object is to determine, neither the principles which prevail in it nor the connections between its phenomena, but its relationship to God. Religion declares the universe to have a

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<sup>1</sup> Chapter xi. §§ 1 and 2.

relationship to God; and natural theology assumes the task of determining, so far as it can, the nature of this relationship.

Furthermore, the natural theologian is ready, at any time, to abandon any particular view of the relationship of the universe to God when called upon to do so by increase of knowledge. His principles compel him to welcome every new truth which is of value in the interpretative sphere. He knows that while any facts remain unconnected with the general body of knowledge, there is a possibility of a radical re-adjustment being required in his views; and he also recognises that a perfect view of the relationship of the universe to God can only be arrived at when his knowledge of the universe enables him to completely unify the universe. It is not his place to project himself into the unknown, and speculate vaguely with regard to the mystery of things, but to trust to the solid ground of Nature, and rise from Nature to the God of Nature. And if the solutions which he has hitherto given of the mode in which God is manifest in Nature have been uniformly invalid, it is not his religious instincts which have been at fault, but his scientific conceptions of what Nature really is. Erroneous scientific conceptions cannot but lead to errors of religious interpretation.

### § 6. *Is a Natural Theology possible?*

Repeated failures to construct a true natural theology are from the very nature of the case to be expected. The natural theologian reasons from the facts, and the generalizations of facts, supplied by the inductive sciences, and is, in his reasoning, exposed to the danger which attends upon all use of generalizations of the inductive order, viz., that the general view of facts may, at any time, be changed by a further discovery of facts, or the formation of wider generalizations of facts. And than this danger no more fruitful source of error exists; as is illustrated in the history of every science, by the slow progress of the human mind from the darkness of ignorance and error, to the light of true conceptions of the universe. The Ptolemaic system of astronomy held its ground as a tenable theory of the heavens until the more

accurate view of facts presented by the telescope effectually wrought its downfall; the corpuscular theory of light was capable, in Newton's day, of explaining all the known phenomena of light, and was considered reasonable for more than a century before crucial experiments revealed its invalidity; and numberless other instances can readily be quoted of the like hypotheses that have, for a time, in consequence of the imperfect state of knowledge, gained assent as truths. But no one, marking the slow and sinuous progress of a science through imperfect and wrong hypotheses to the ultimate establishment of the true theory, dreams of charging upon the science the errors that arise from imperfect data. Allowance is duly made for the disturbing influence of new facts, or of new and more perfect views of facts. And this allowance can be claimed by none more worthily than by the natural theologian whose conclusions, whether based upon a particular section of facts, or on a review of the whole body of facts constituting human knowledge, are in no degree less liable than those of the scientific investigator to disturbance from the discovery of new facts, or the attainment of clearer views of facts.

The natural theologian, however, labours under the special disability that, from the nature of the case, he cannot hope to apply to his conclusions either of the usual tests of the validity of inferences from facts—experimental verification, or the formulation of deductions anticipatory of the discovery of new truths. He is robbed of an immediate criterion of the truths he enunciates, and must be content to leave them exposed to the testing influence of time. And, remembering this, it is no wonder that the attempts made to construct a natural theology appear to have been quixotic and inane. For there are few thoughts of man that remain throughout ages changelessly true and unmodified in expression; and his views of Nature, and his speculations thereon, are, of all his thoughts, peculiarly liable, as the horizon of knowledge extends, to removal into the cloudland of fancies and into the region of visions and dreams. Indeed, we may enunciate the general truth that no natural theology can possibly be constructed which shall be for all time, and which will continue to preserve

its essential features throughout time. The conclusions established in any system of natural theology are strictly relative to the knowledge of Nature upon which the system is based; and upon the permanency of the view of facts this knowledge presents, the continued acceptability of the conclusions entirely rests.

But although this is so, natural theology is not in consequence deprived of all claim to consideration. For while it can have no claim to be recognised whenever it advances its conclusions on crude views of un-coordinated facts, which are manifestly capable of presentation from other points of view, it can legitimately assert a claim whenever the general sense of mankind assents to the stability of the view of facts upon which it is founded.

It is sufficient for a tenable natural theology, if the position be established, that such and such a view of the relationship of Nature to God is, so far as we can discern, the only conclusion permissible. We may prove that, so far as our knowledge extends, certain ideas with respect to God and Nature must be entertained; and, if increase of knowledge afterwards destroy the basis of these ideas, it does not follow that no other basis for them exists, and that we are therefore rendered incapable of entertaining any such ideas at all. If Nature proceeds from God, Nature must have a relationship to God; and no failure on the part of man to accurately apprehend this relationship can destroy it. On the supposition that Nature exists through the Purpose of a Personal God, it is to be expected that nothing short of a perfect knowledge of Nature will enable us to apprehend with clearness and fullness the purpose of God. And if at any time our interpretations of the universe are proved to be erroneous, we may comfort ourselves with the thought that a limited knowledge of Nature cannot but lead to an imperfect realization of the relationship of God to Nature.

Our ideas respecting the mode of the manifestation of God in Nature of necessity undergo modification from time to time as knowledge increases; but if under every new advance of knowledge the rational consideration of our position leads only

to the replacing of old and imperfect ideas by new and more perfect ones, the suspicion that after all we cannot attain to fixity of conception need not trouble us. For a time, indeed, we may, on some new advance of knowledge, be burdened by the fear that all our thoughts of God are as nought, and feel oppressed at a sense of things nebulous and obscure, presenting no definite aspects that resistlessly suggest the operation of God; but hardly shall we have despairingly reconciled ourselves to this dreary vision when, having become familiar with our new surroundings, we find anew intimations of the Divine. A little boy picks up a pebble rounded and smooth, and struck with wonder says, God made it so; but because another boy a little older contemptuously snatches it out of his hand, and talks of the ceaseless friction it has undergone in a river bed, shall he think that the wonder of the thing has ceased to exist? By-and-by when both boys are older, there will come to them the new wonder of the running water and the stone in its bed; and then they shall sit down together and talk in whispers of the wonderful ways of God.

## CHAPTER II.

### THE ARGUMENT OF DESIGN

#### § 1. *Preliminary Considerations.*

THE natural theology of an age, to possess any value as interpretative of the universe, must be in accordance with the presentation of the universe, given by the scientific spirit of the age; and, if at any time the principles on which it is based, and the evidences by which it is supported, be such as by the increase of knowledge are no longer in harmony with the scientific view of things, new evidences must be sought for, and new principles discovered. New conceptions of Nature bring with them new ideas of the God of Nature; and ideas of the relationship of Nature to God, which are no longer countenanced by the facts of the case, must give place to others in agreement with the facts. New wine must not be put into old wineskins; nor new conceptions attached to old and worn-out arguments.

And at no time more than the present time, when the doctrine of evolution is transforming in every direction the thoughts of men, ought these general considerations to be held steadily in mind. The change which is taking place in our conceptions of things is not one of *degree*, in which old conceptions remain in an amplified form, but one of *kind*, in which new conceptions thrust out the old. And the consequent change in our views of the religious significance of Nature is not less revolutionary in character. Formerly we knew the universe only as it existed in space; and, incapable of glancing along the corridors of time, we ascribed the dispositions of the universe to the immediate operation of a creative Will, and conceived the Creator to be a mighty



Intelligence, existing apart from, and designing the works of Nature. But, step by step with the advance of the evolution teaching that the present is the outcome of the past, the inappropriateness of this conception of the Creator has become more and more apparent. And, concurrently with the recognition of the fact that the universe not only exists in space, but has also a history in time, the view of final causes, as applying to the design of the works of Nature by the God of Nature, has given place to an attitude of mind which, regarding all things as governed by fixed conditions, recognises the necessity of a new conception of the operation of God. Another dimension, that of time, has been added to those under which we previously conceived of the universe, and the old argument of design, whether as advocated by Paley from the adaptations of animal life, or as inferred from the dispositions of the universe at large, no longer agrees with our conceptions of things, and has no place in our enlarged vision.

Natural theologians, however, still cling to Paley's method; and, from time to time, attempts are made to re-state Paley, and show that in the light of evolution the argument of design is not destroyed. And in the present chapter, with a view to clearing the ground of much debatable matter, we propose to briefly consider the position of evolution, both with regard to Paley's argument, and with regard to the more important of the attempts to re-state it.

## § 2. *The Argument of Paley.*

Paley saw in every form of life proofs of contrivance; the eye made for seeing, wonderful examples of mechanical skill to be met with in every animal, and throughout creation the forms of life adapted to their modes of life with a perfection and exquisiteness truly surprising. Hence, he concluded, from the analogy of the watch which he supposed to be found on a moor, that there is an Intelligent Designer. And this conclusion would be irrefutable enough if, as in the works of a human artizan, the forms of life could still be viewed as created with all their structures ordered and arranged with a special view to the performance of their particular

functions. But the doctrine of evolution permits us no longer so to view them. The eye exists undoubtedly for the purpose of sight; but this, and all other adaptations of structure to function in the economy of life, are, according to the teaching of evolution, not immediately suggestive of a final cause, but simply the outcome of the interaction on each other of organisms and their environment, in accordance with fixed conditions analogous to those which have led to the evolution of the sun and its attendant planets. As the sun and planets of our solar system are the result of a process of evolution in the forms of matter under the action of the laws of motion and of universal gravitation, so are the adaptations of life-forms similar results of similarly determinate laws. They are not definite and rigid products, like the works of man, but are modifiable features depending upon structures which are plastic and subject to variation. And from the first appearance of life on the earth, an incessant struggle for existence has prevailed, in the severity of which higher life-forms of greater complexity of structure and more varied adaptative features have, through the process of natural selection, been gradually developed from lower life-forms of less complexity of structure and simpler adaptations; and the contrary is also true, that life-forms have degenerated in complexity of structure and in range of adaptation, when, through the favourableness of the environment, the struggle for existence has been reduced to a minimum. Thus evolution considerably affects the incidence of Paley's argument; and it may fairly be questioned whether the analogy of the watch, in the crude form in which Paley states it, is at all apposite to the problem of explaining the origin of adaptations. The problem is rather analogous to that of explaining the form of the stone, perhaps water-worn, against which Paley supposed that he pitched his foot, but left disregarded; for as a water-worn stone tells the story of the influences to which it has been subjected, so the adaptations of life-forms tell of the conditions under which life has been able to live.

Adaptations are the result of a process of evolution in time, and are dependent upon fixed conditions of evolution; and no inference with regard to their significance as objects of design



can be permitted which does not take account of the order of evolution, and make manifest that the conditions of evolution imply design.

It is not sufficient to point out in them the fitness of the means to the end; for the association of the means and the end may be no more than an accompanying circumstance of the evolution process. We need evidence that the fitness is inherent in the conditions. We might say, for instance, with regard to a particular watch we had seen made, that there was no evidence in the arrangement of its parts of an intelligence which designed it, but merely of a mechanical dexterity on the part of the watchmaker who made it; and unless we further considered the matter and recognised the watch to have been evolved by human intelligence as a means of measuring time, we should fail to arrive at the idea of it as an object of design. The design is proved, not by the actual arrangement of the parts, but by the intelligence manifested in originating the arrangement—in the choice of materials for an effective and portable time-keeper such as gold and silver, in the discovery of powers to produce and maintain the motion such as the spring and fusee, in the combination of parts such as the relations of the toothed wheels, and in the regulation of the motion by suitable appliances such as the escapement: all of which demanded the exercise of intelligence. And similarly, unless, in addition to the fact that adaptations are like watches, contrivances which secure certain ends, we clearly discern that the conditions of evolution are co-ordinated to produce the ends, and prove that this co-ordination involves the exercise of intelligence, we cannot infer adaptations to be designed.

Nor is it sufficient to accept, as many do, the conclusions of Paley; and then explain that evolution is concerned only with the manner in which the design is executed. The facts, on which Paley built up his argument, are part of the facts of evolution; and, as such, they must be viewed in the light which evolution throws upon them before Paley's argument be allowed a place in the mind. We cannot isolate the facts of adaptation from the general order of evolution; and to argue

that evolution only pushes the matter farther back, and renders the application of the argument more remote, or to seek to show that, by taking such and such a view of evolution, the evidences of design are not destroyed, is simply to fit the facts to the argument, instead of the argument to the facts. And we must not expect for one moment that this procedure will commend our views to those who require a proof of our initial assumption that design is manifested.

Any attempt to proceed on the lines of Paley, and maintain that the doctrine of evolution in no degree affects the argument of design, commits itself to a false view of facts, and inevitably leads to sophistical reasoning. And the only true method of procedure is to clear from the mind all ideas of design, and follow the teaching of evolution whithersoever it leads. Truth cannot be lost; and whatever elements of truth the argument of design may contain will reappear, and more readily gain assent when reset in the ideas appropriate to our more extended knowledge.

### § 3. *The Attempts to re-state Paley's Argument.*

It is impossible to arrive at truth if we begin with erroneous notions, and attempt to assimilate to them the true view of things. But this, as we shall find on examination, is precisely what is done by those who, re-stating the argument of design, endeavour to show that the doctrine of evolution does not oppose it. And in all the gradations of thought, from the crude re-insistence on Paley's argument by the Bampton Lecturer, who, in 1884, treated of the relations of Religion and Science, to the refined presentment of the idea of design in the argument from order by Professor Flint, in his *Baird Lectures on Theism*, there is manifested the same incapacity to discern that the facts of the universe must be looked at as facts of evolution, before they can be taken as evidences of design. This vitiates their whole procedure, and were it not for the reason already given, and the additional reason that the attempts of error to perpetuate itself are unable to resist the secret and silent influence of the true view of facts, and lead us imperceptibly to the confines of truth, we confess

that the task before us, of examining their views, would be both tedious and unprofitable.

(a) *The Bampton Lectures of 1884.*

The Bampton Lecturer takes the argument of design to be entitled to all the nine points, said to be allowed by law to those in possession. He states, however, in his fourth lecture, the objection to its title in the following terms:—

“If animals were not made as we see them, but evolved by natural law, still more if it appear that their wonderful adaptation to their surroundings is due to the influence of those surroundings, it might appear as if we could no longer speak of design as exhibited in their various organs; the organs, we might say, grow of themselves, some suitable, and some unsuitable to the life of the creatures to which they belonged, and the unsuitable have perished, and the suitable have survived.” (p. 111.)

But with the *finesse* of an advocate, he maintains that Paley himself has supplied the clue to the answer; and thus proceeds:—

“In his well-known illustration of the watch picked up on the heath by the passing traveller, he [Paley] points out that the evidence of design is certainly not lessened, if it be found that the watch was so constructed that, in course of time, it produced another watch like itself. He was thinking not of evolution, but of the ordinary production of each generation of animals from the preceding. But his answer can be pushed a step further, and we may, with equal justice, remark that we should certainly not believe it a proof that the watch had come into existence without design, if we found that it produced, in course of time, not merely another watch, but a better. It would become more marvellous than ever if we found provision thus made, not merely for the continuance of the species, but for the perpetual improvement of the species. It is essential to animal life that the animal should be adapted to its circumstances; if, besides provision for such adaptation in each generation, we find provision for still better adaptation in future generations, how can it be said that the evidences of design are diminished?” (pp. 111–12.)

But how argumentation such as this, can be thought to prove the compatibility of evolution with design, is more than we can imagine. In the first place, the objection from the evolution standpoint is stated in terms which convey a very inadequate and erroneous conception of the evolution order. And in the second place, in answering the objection, the ground of objection, that animals are "not made as we see them, but evolved by natural law," is incontinently set aside, and the whole question begged by the assertion that the "natural law" is itself a matter of provision.

The lecturer, in fact, calls upon evolution to answer at the bar of Paleyism, whereas Paleyism ought to answer at the bar of evolution. He speaks from the standpoint of Paley of the production of each generation of animals from the preceding as a matter of provision; and afterwards reads this idea of provision into the evolution process, because he sees, again from the standpoint of Paley, that "it is essential to animal life that the animal should be adapted to its circumstances." He never inquires how far this, which he regards to be essential, can with propriety, from the point of view of "natural law," be regarded as requiring provision to be made for it. Nor does he discern that, in the evolution view of things, an animal and the circumstances of an animal are not distinct and independent orders of phenomena, which are brought into relationship with each other through the medium of adaptations, but are rather correlated phenomena, which arise together under the conditions of evolution, so that the circumstances of an animal are strictly relative to the animal, and expressive only of the circumscribed sphere of existence entailed upon the animal by the character of its evolution.

In another place, however, after pointing out that evolution enables us to meet the objection of "needless pain and waste," by virtue of the fact "that we are looking at a work which is not yet finished," the lecturer places before us the design argument in a form which is a distinct advance upon his previous slavish fidelity to Paley.

He tells us:—

“If the natural theology were now to be written, the stress of the argument would be put on a different place. Instead of insisting wholly or mainly on the wonderful adaptations of means to ends in the structure of living animals and plants, we should look rather to the original properties impressed on matter from the beginning, and on the beneficent consequences that have flowed from these properties. We should dwell on the peculiar properties that must be inherent in the molecules of the original elements to cause such results to follow from their action and re-action on one another. We should dwell on the part played in the universe by the properties of oxygen, the great purifier, and one of the great heat-givers; of carbon, the chief light-giver and heat-giver; of water, the great solvent and the storehouse of heat; of the atmosphere and the vapours in it, the protector of the earth which it surrounds. We should trace the beneficent effects of pain and pleasure in their subservience to the purification of life. The marks of a purpose impressed from the first on all creation would be even more visible than before.

“And we could not overlook the beauty of Nature, and of all created things, as part of that purpose coming in many cases out of that very survival of the fittest of which Darwin has spoken, and yet a distinct object in itself. For this beauty there is no need in the economy of Nature whatever.” (pp. 118-20.)

Here, instead of being directed to the consideration of particular pieces of mechanism, our attention is drawn to the original and inherent properties of things, and the beneficence of the system of evolution, as developed from these properties, is placed before us. We witness the interactions between one thing and another, and mark the manifold uses which things acquire. We see one thing adjusted to another, and the lower subserving the higher in an unending variety of ways. And so perfect is the order and adjustment of parts, that the thought of an Almighty and Beneficent Disposer irresistibly suggests itself. But yet, when we look carefully into it, the legitimacy of the thought is more than doubtful. The flaw lies here: that when we concentrate the attention upon particular adjustments, with the object of discerning in them a purpose, we perceive that every adjustment in the universe is a relative



adjustment; and relative adjustments are, in themselves, no evidence of a general plan. We cannot from any of the adjustments of the universe infer a purpose, unless we are assured of the tendency of evolution, and are able to single out the object, or objects, to which all things minister. To dwell on the part played by oxygen, "the great purifier, and one of the great heat-givers," or by any other of the dispositions mentioned, establishes nothing more than that, relatively to life, these dispositions have important and necessary functions. We make clear their vast importance to the well-being of the forms of life which inhabit the earth, and so far we infer beneficent consequences,—if, that is, it be not a misuse of terms to apply the term beneficent to conditions which, however essential to the well-being of life, are also the conditions under which alone life has been able to live. But beneficence is thus inferred to exist relatively to the well-being of life only, and this does not necessarily prove it to pertain to the general scheme of things. There are other adjustments just as harmful to life as these are wholesome. And why should the wholesome be insisted upon to the exclusion of the harmful? Moreover, a full and careful consideration of the evolution order is needed to determine the objects to which purpose is directed. And life may not be so important in the general scheme of things as the lecturer imagines.

We may not assume, as the lecturer does, that whatever is beneficial or subservient to life, partakes of the general nature of beneficence or plan; for so to exalt life without a previous demonstration of the unique position it occupies in the universe, is to commit an error of the gravest kind. Nor, again, can we rashly assert that the beauty of Nature is "a distinct object in itself," for which there is no need in the economy of Nature; for the sentiment of the beautiful is strictly relative to the powers of mind, and it depends upon the view we take of mind whether we see purpose manifested in the existence of things beautiful. In short, it is not from a cursory glance at certain orders of facts, such as the lecturer gives, but only from the painstaking and unbiassed examination

of the whole order of evolution, that we can arrive at a decision whether there be beneficence in the general order of things, and purpose in both the adjustments of the universe and the beauty of Nature.

(b) *Archdeacon Wilson's Address on Water.*

The original properties of things, on which the Bampton lecturer insists, are also adduced in support of the argument of design by Archdeacon Wilson, in his address on water.<sup>1</sup> The Archdeacon admits that "adaptation does not always imply design"; that just as "a river bed was not made *for* the water, but *by* the water," so "the adaptation may not be prior to the circumstances, but the result of the circumstances." But he holds that there are certain "unchangeable inorganic parts of nature" which represent, to his mind, "the original foundation, the materials of the stage on which the magnificent drama of evolution is unfolding itself, and exhibiting in operation the ideas of the Creator." (p. 20.) And the stages of the argument derived from these, he gives as follows:

"We rise successively and, I think, inevitably, from the perception of *order* to that of *fitness*; and fitness passes into *adaptation*. From this we infer, in these cases of adaptation of the unchangeable, *intelligence* and *design*. Design implies *Mind* and *Will*; and Mind and Will are nothing but *personality*." (p. 21.)

In other words, Archdeacon Wilson places before us an argument which professes to do what we have indicated the argument of design ought to do; that is, make it manifest that the conditions of evolution are so co-ordinated that in their co-ordination we have indisputable proof of the exercise of intelligence.

How we rise from order to the inference of design he thus explains. Order is a fact of Nature; but "the fact of order is no sufficient account of the origin of order," and we are compelled to see "more than order: we see fitness." Hence we infer "that the fitness is made; or, in other words, we infer

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<sup>1</sup> *Essays and Addresses*, Macmillan, 1887.



adaptation." Adaptation, however, is in many cases the result of the process of evolution; but the unchangeable inorganic parts of Nature cannot be regarded as products of evolution, and therefore, in their case, we are "face to face with no secondary cause, but with a primary cause, a cause of a different species—moral, not physical." (p. 22.) And, as an example of adaptations which imply the existence of this primary cause, he takes the peculiar properties of water—its unique property of expanding on a fall of temperature when near its freezing point, the adjustment between it and the atmosphere, the greatness of its specific heat, its absorption of radiant heat, its chemical property of dissolving salts, its importance in the transformation of the earth during Geological ages, and the revelation of beauty in its varied relations to the transmission of light. All these are of the greatest value in rendering the earth habitable, and in subserving the needs and delights of man; and he tells us "that it is contrary to all evidence to imagine an evolution of such properties," and that in the operation of the cause to which they are due we are bound to infer "intelligence, resource, foresight, design." The peculiar properties of water, he grants, probably all result from some single property; but this, he holds, does not destroy the argument. "We must accept," he says, "either *growth* of the properties of water, or *design* in them." (p. 23.)

These views, we admit, are ingenious to a degree. And, moreover, they are stated in such a way as to be free from the objection which we have taken to the Bampton Lecturer's use of the same facts. The design is seen not in the purposes which the original properties fulfil, but in their co-ordination to effect these purposes. But yet, notwithstanding the ingenuity of these views, and their apparent conformity to the requirements of the case, we cannot but perceive that they are founded upon a very imperfect apprehension of the order of evolution. Archdeacon Wilson sees a process of evolution only in phenomena which admit of growth, and takes no account of evolution processes whose conditions are different to those which obtain in the evolution of things which grow. His principle is, what does not admit

of growth cannot have been evolved and must have been designed. But the properties of water, or of any other of the unchangeable inorganic bases, undoubtedly arise under appropriate conditions, and depend for their existence upon these conditions; and, though they do not admit of growth, they are nevertheless products of evolution, inasmuch as their conditions depend upon the conditions of the physical evolution. Hence, we cannot, even according to the Archdeacon's own line of reasoning, summarily conclude that they were designed. Indeed, we have a suspicion that in the Archdeacon's argument we have nothing more than an attempt to evade the conclusion that the unchangeable inorganic parts of Nature are products of evolution, by reading the circumstances and processes of the evolution of plant- and animal-life into the general order of evolution. He sees only the evolution of life, and is blind to the evolution of matter. It is certainly impossible to imagine an evolution of the properties of water, if, by evolution, we are to understand evolution as it occurs in the phenomena of life; but this does not carry with it the implication that water is not a true product of a physical evolution. Many other irregularities, in addition to the special ones of water, are observed to prevail with regard to the law of expansion of liquids under constant pressures between their freezing and boiling points. Nature is full of such individual marks and apparent exceptions to particular physical laws; but these peculiarities are not therefore original and independent, rather they are the individualities of feature arising under the particularities of circumstance which attend the evolution of the forms of matter.

#### § 4. *The Argument from Order to Design.*

But these considerations, while they militate against the special argument of Archdeacon Wilson, and make manifest his imperfect apprehension of the evolution teaching, leave untouched the general argument, of which he catches a glimpse, and which, from the inherent order and adjustment in the universe, infers the operation of a Supreme Intelligence. The

properties of water are beyond doubt remarkable, and are correlated to manifold phenomena which, in the order of evolution, have succeeded the deposition of water upon the earth. Also in their variety they constitute the conditions of an extended evolution, in which each lies at the base of an appropriate series of evolution products; and if evolution forbids us to see in them immediate evidence of a design which implies a designer, it does not follow that it also forbids us to infer from their order and adjustment the existence of an Ordering Intelligence. That this is a possible argument we have already indicated in our remarks upon the watch; and, indeed, it brings before us the only just and proper way in which a parallel can be drawn between the dispositions of Nature and the works of man. The order and adjustment produced by man we know to be due to the co-ordination by intelligence of the conditions under which they arise; and if, in the order and adjustment which prevail in Nature, we perceive that there is likewise a co-ordination of the conditions, we are at liberty to proceed further and consider whether the similarity of operation be not due to a similar agency. And here we argue, not from design, but towards it, not from design in the adaptation of parts to a Designer, but from the inherent order and co-ordination of parts to a co-ordinating Intelligence; and the unsoundness of the argument *from* design does not imply unsoundness in the argument *to* design.

And in what degree natural theologians have dealt effectively with this argument we must now examine. That they fail to set it in its proper relation to the evolution order will, from what we have said, be already suspected, but it is more particularly in the bearing of their views on the Wisdom and Goodness of God that we find matter for criticism; and both in the less perfect and transitional form which is given to the argument in M. Janet's *Final Causes*, and in the more matured presentation of it in Professor Flint's *Theism*, we find no escape from certain weighty objections to both the Divine Wisdom and the Divine Goodness.

(a) *M. Janet's "Final Causes."*

M. Janet explicitly states that the organs of living beings, and, above all, of the superior animals, call forth rightly or wrongly the idea of an end, and he considers that the effects we observe in experience, such as seeing, flying, walking, and self-nourishing animals, take the character of ends by reason of the character of the combinations which have rendered them possible.

"The human mind," he says, "requires a cause, not only in order to explain phenomena, that is to say, that which strikes the senses, but also in order to explain what does not strike the senses, namely, the *order* of the phenomena." (p. 27.)

And for this order there must be a precise cause, which, in some combinations of phenomena, is sufficiently determined, when we refer the combination to its antecedent conditions.

"But," says M. Janet, "when the combination, in order to become intelligible, must be referred not only to its anterior causes, but to its future effects, the simple relation of cause to effect no longer suffices, and is transformed into a relation of *means to ends*." (p. 32.)

And as an example of such a combination he takes the case of a stomach fit to digest flesh. This, he argues in the following manner, cannot be a simple consequence, but must be an end.

"How does not the stomach, which digests meat, digest itself? How does not the gastric juice, which attacks and dissolves all sorts of food, dissolve the stomach, which is precisely of the same nature as other foods? Well, now, it appears that Nature, answering the objection beforehand, has endued the internal walls of the organ with a special varnish, which renders them unassailable by the action of the gastric juice. How can anyone refuse to admit that the production of this varnish has a determinate and rigorously calculated relation to the future phenomenon, which the stomach had to produce? To say that such a relation does not exist, and is the result of a pure coincidence, is to admit that while certain physical causes produced the substance called stomach, other

causes, without any accord with the preceding, produced the substance called epithelium, which is found to be precisely the condition *sine quâ non* of the digestive function. These two series of causes, working in the dark without any relation between them or with the future, yet end by harmonizing, and by their accord render possible the future phenomenon, which would not be so without it. Is it not renouncing the principle of causality merely to see in this a fortuitous coincidence, and the result of certain happy chances?" (pp. 32, 33.)<sup>1</sup>

But it is evident that M. Janet is here reasoning altogether from the pre-evolution point of view, and consequently fails to see that two or more series of causes, which combine to produce a certain result, may do so simply in consequence of their mutual dependence on general conditions of evolution. He argues from order to an end; and the only other supposition which he admits into his argument as possible, is the alternative of chance. Two or more sets of phenomena come into relationship with each other; and we must, on his view, either admit the validity of the doctrine of an end, or conclude the relation formed to be due to a happy and fortuitous coincidence. But he fails to grasp that there is a third alternative, and that we at once escape from the acceptance of either of the views to which he would confine us, by denying the two or more sets of phenomena to be intrinsically independent. In the example above quoted, for instance, he evidently looks at the matter thus:—"Given the stomach, what are the chances that it shall not digest itself?" And, seeing no possibility of the operation of chance, he immediately sees in the endowment of the stomach with a protecting epithelium, the evidence of an end. But it is easy to object that assimilation of food is a property of protoplasm in general, and must have taken place long before there were forms of life in which digestion took place in a stomach. The stomach only comes in as a means whereby an end, already attained, can be more advantageously attained; and the whole structure of the organ is an evolution from the previously existing tissues in which

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<sup>1</sup> AFFLECK'S English Translation.



assimilation occurred. The associated phenomena are, therefore, not independent, and the end they subserve is only a secondary end; and hence the restriction to a choice between design and chance is wholly irrelevant to the facts of the case. The proper way to examine the instance is not to ask, "Given the stomach, what are the chances that it shall not digest itself?" but to ask, "By what means has the stomach, with its coating, been evolved, so as to take up the function of the digestion of food?" And the answer to this question, with whatever teleology it may involve, can only be given after a careful examination of all the facts of the adaptation from the true evolution point of view.

Such an examination may indeed make manifest, as M. Janet elsewhere contends, that natural selection does not of itself explain the origin of adaptations, and that some other factor must also be taken into account. But even if so, it is not at all clear that, as M. Janet argues, this factor is an internal principle of transformation, which gives full sway to the idea of finality. What factors, however, if any, are supplementary to natural selection we cannot here discuss. And it suffices us, in the present connection, to put the question, whether M. Janet ever sufficiently weighed all that is implied in the conclusion that the adaptations of animal life involve the principle of finality.

If we seek and find in adaptative features a final cause, we must be prepared to meet the weighty objection that, if the adaptations of animal life are of such a nature as to be endowed with finality, it is impossible to reconcile with the Wisdom and Power of the Ordering Intelligence, the extreme wastefulness of the process by which they have arisen; for any general condition, which determines the nature of the adaptations, must be judged to be part of the conditions imposed by the Creator for the realization of His Purpose; and there would be no escape from the indictment against Him, that His purposes have been realized in such a manner, that the earth has become the charnel-house of myriads of forms of life which have perished through the severity of the struggle for existence. And again, it could be urged

against us that, if the adaptations of the forms of life are ends in themselves, and manifestations of the Purpose of God, this end and purpose must be equally manifest in all adaptations, not only in the progressive forms of man and of the higher animals, but also in the retrogressive forms of the parasites which prey upon them: for if purpose be judged to accompany development in one direction, because of the character of the adaptative features, it cannot be denied of degeneracy in the other where the adaptative features are no less wonderful.

(b) *Professor Momerie's "Personality."*

The argument from order to design, as stated by M. Janet, is too strongly impregnated with the Paleyan doctrine that every adaptative feature bears the marks of finality, to permit of the inference of design, apart from a regard to the beneficent consequences, or want of such, which attend upon the design. The case is different, however, with the argument as stated by Professor Momerie, in his short treatise on Personality. Professor Momerie pointedly rejects the view that "every definite organ, or portion of an organ, is specially adapted for a special end" (p. 116); but he sees design "in organisms regarded in their entirety, and in Nature considered as a whole" (p. 117). And here all objections which proceed on the imperfection or want of beneficence, in the plan of creation, lose their relevancy; for, if in the order of Nature we trace the broad outlines of a design, it is manifestly insufficient to take exception to accompanying circumstances of the design, such as the harshness of the struggle for life, and the existence of parasites. We prove design and manifest purpose to exist, which is all that the design argument in itself can do; and if we are powerless to proceed further, and see in every detail the wisdom and morality of the design, the defect is not in the argument, but in its insufficiency unallied with other arguments to declare the whole purpose of God.

Professor Momerie's argument is this:

"If we see order and progress in human arrangements, we infer a human will—a finite ego—and since we see (the Positivists themselves



being judges) order and progress in Nature, it is in reality by a strictly experimental argument that we infer a superhuman will—an Infinite ego." (p. 127.)

But if this argument be not open to the objections we have taken to M. Janet's argument, it is exposed to others not less serious. It claims, we notice, to be experimental. So far as it proceeds, however, on the fact of order alone, we are doubtful if it can be maintained to be of an experimental order; and certainly without the additional fact of progress we cannot infer design. And, even with the fact of progress, it would seem that, before we can be asked to attach to order and progress the idea of an Ordering Intelligence, we ought to be assured that the conditions of evolution are such as of necessity lead to progress. From the order and progress in human arrangements, we infer the existence of a human will, because we perceive the order and progress to be due to conditions co-ordinated by the exercise of will; and, if from the order and progress in Nature, we are in like manner to infer the existence of a superhuman will, we must have no uncertainty with regard to the fact, without which their analogy to human arrangements\* is incomplete, that the order and progress in Nature are the necessary results of a co-ordination of the conditions of Nature. And our objection to Professor Momerie's argument is that we have no conclusive evidence that this is the case. The progress we see in Nature is, so far as we can discern, governed by conditions which possess no advantage over the conditions which prevail in degeneration; and, though we have undoubtedly "the evolution of higher and higher forms of existence," we have not, as Professor Momerie imagines we have, any evidence that Nature has been co-ordinated to secure this "progressive result." The system of things of which the intelligence of man is the crown and ornament, contains also the ferocity of the tiger, the destructiveness of the serpent's fang, and the remorseless devastation of the bacilli. And all that we learn from Nature is that every form of life, independently of its position in the scale of life, continues to be adapted to the conditions of existence in

closer degrees of correspondence, while there is room for adaptation, and perishes when it has become so rigorously adapted to particular conditions that, under slightly changed conditions, it is thrown hopelessly out of gear.

Professor Momerie's argument, therefore, cannot be sustained; unless, indeed, we are able to infer that in the particular case of man there exists, by virtue of his intelligence, a possibility of indefinite modification, so that under all possible changes of the conditions of existence his progress is secured. But how can we be assured that this is so? Allowing full weight to the modifying power of his intelligence, are the conditions of man's existence different in kind from those of other animals? Is he not as dependent as they are upon the supply of solar energy, and the continued productivity of the earth? It is very true that in the history of man we have hitherto marked a continuous progress, advancing at times by leaps and bounds; but for the discernment on experimental lines of purpose and design, we require that the progress shall not be relative to particular periods of time, but inherent in the conditions of life. A perfect creation—and none other can be postulated in view of the marvellous unity which evolution reveals—implies not only that the stream of tendency shall set through particular ages, to the advantage of the higher products of the Creative Will, but also that this advantage is inherent in the conditions of existence; and if we find, on an impartial view of the conditions of existence, that there are no clear indications that this is so, we cannot, from a limited order of progress, infer design.

(c) *Professor Flint's "Theism."*

It is, however, the form of the argument as elaborated by Professor Flint that calls most imperatively for our attention.

Recognising the existence of an *ego* or personality in every being who manifests intelligence and will, Professor Flint maintains that the manifestations of God—the Infinite *Ego*—are similarly to be recognised by acts of creative intelligence and will. Each individual man in his own person knows of the existence of personality, and by the manifestation of

feelings, thoughts, and volitions on the part of other men, infers, in each case where the manifestations occur, the existence of a like personality. And so with regard to God. God and His attributes, apart from revelation, are discernible only from the manifestations of God.

“Our knowledge of God,” he says, “is obtained as simply and naturally as our knowledge of our fellow-men. It is obtained, in fact, mainly in the same way. In both cases we refer certain manifestations of will, intelligence, and goodness—qualities which are known to us by consciousness—to these qualities as their causes. We have no direct or immediate knowledge—no intuitive or *a priori* knowledge—of the intelligence of our fellow-creatures, any more than we have of the intelligence of our Creator; but we have a direct personal consciousness of intelligence in ourselves which enables us confidently to infer that the works both of God and of men can only have originated in intelligences.” (pp. 76-7.)

And, seeking in Nature for manifestations of will, intelligence, and goodness, Professor Flint finds the evidences or proofs of God’s existence to be countless.

“They are to be found in all the forces, laws, and arrangements of Nature, in every material object, every organism, every intellect and heart. At the same time, they concur and coalesce into a single all-comprehensive argument, which is just the sum of the indications of God given by the physical universe, the minds of men, and human history. Nothing short of that is the full proof.” (pp. 62-3.)

We think of God as Cause from our own direct experience of causation in the consciousness of volition, but the principle of causality does not in itself enable us to apprehend the Deity: without the evidences of intelligence, the evidences of power could only tell us of an ultimate force. And hence to the experiences of causation we must add that knowledge of the nature of intelligence which, inherent in self-consciousness, convinces us that intelligence “alone can fully account for order, law, and adjustment.” Further, to these, that we may “think of the Creative Reason as righteousness,” we must add the testimony of the conscience; and that we may think of

Him as a "Being whose existence is absolute, whose power is infinite, whose wisdom and goodness are perfect," we must take note that "there are within us necessary conditions of thought and feeling, and ineradicable aspirations, which force on us ideas of absolute existence, infinity, and perfection, and will neither permit us to deny these perfections to God, nor to ascribe them to any other being." (p. 68.) And thus "Will, intelligence, conscience, reason, and the ideas which they supply ; cause, design, goodness, infinity, with the arguments which rest on these ideas,—all coalesce into this one grand issue" (p. 72)—the apprehension of God.

With the philosophy which underlies these various positions of Professor Flint, we have, of course, nothing to do. We are here concerned only with the inferential part of his argument, and its relevancy to the facts of the case. And so far as it is inferential, it is manifest that the keystone of the whole argument lies in the inference of intelligence. Without this inference, the testimony of Nature to God as Cause is incomplete, and the moral argument falls, while with it causality is endowed with purpose, and moral tendencies are perceived to be Divine. Does Professor Flint, then, satisfactorily show that the universe is the work of an Intelligence ?

We notice that he takes exception to the statement of the design argument, "that it rests upon the analogy between the works of Nature and the works of art"; and says that "it rests directly on the character of the works of Nature as displaying order and adjustment." (p. 158.) Also, that he allows of a valid inference from final causes, only when final cause means "the inherent order and adjustment of things—not when it means designs and purposes regarding them." (p. 167.) These points constitute his distinctive position, and to neither, if rigidly applied to the evolution order, are we here disposed to raise serious objections ; but the procedure of Professor Flint—when in accordance with this position he marshals the evidences in its favour, and afterwards argues that mind alone can account for the system of order, and that to refer it to anything else is "essentially contrary to reason, essentially irrational"—is far from satisfactory.

He passes in review the facts of Nature, and concludes—

“There is then, everywhere, both in the physical and moral worlds, order and adaptation, proportion and co-ordination, and there is very widely present progress—order which advances in a certain direction to a certain end, which is, until realized, only an ideal. This is the state of things which science discloses.” (p. 152.)

But in his review of the facts, he contents himself with a discontinuous view of the universe as presented by the various sciences, and never once enters into the spirit of the evolution teaching. And this radically false view renders irrelevant his whole argument. Only after he has thrown down the gauntlet, and called upon those “who refuse to refer the order and adaptation in the universe to a designing intelligence” to account for them in some other way, does he recognise the evolution teaching that the order, proportion, and progress in Nature are dependent upon conditions. But then, having formed his views, he requires evolution to adapt its testimony to his views, and answer only such interrogatories as they suggest. He speaks of evolutionists as “evading the problem which order presents to reason”; and tells us that, “From Democritus to the latest Darwinian there have been men who supposed that they had completely explained away the evidences for design in Nature when they had described the physical antecedents of the arrangements appealed to as evidences.” (p. 189.) And only on the supposition that it is committed to a false position can he explain “how any sane mind should infer that because a thing is conditioned it cannot have been designed.” (p. 189.) But however just may be these criticisms, Professor Flint, for his own part, is utterly oblivious of the fact that where a thing is conditioned the character of the conditions must have a voice in the determination of the question of design. It is perfectly true that when we prove a thing to be conditioned we do not thereby prove that it is not designed; but it is also true that there can be no inference towards design when a thing which is conditioned is viewed apart from that which conditions it. And when, from a pre-evolution point of view, Professor Flint sees in the universe order and



adjustment, and infers design, he ought not to be surprised if the evolutionist disregards his argument, and charges him with the same error as the theologians of the Paleyan school, that in the light of the sun he cleaves to the preconceptions he had formed in the cave.

The same false view of the facts of the case also runs through and colours his consideration of the objections to the Divine Wisdom, Benevolence, and Goodness. As he finds the evidences of creative Intelligence in order and adjustment, so he looks for the evidences of Divine Wisdom and Goodness in the uses and relations of things. And as he errs in inferring design from the order and adjustment of the dispositions of the universe considered apart from the conditions of their evolution, so he errs in not perceiving that the uses and relations of things are also conditioned by the order of evolution, and that whatever perfection or imperfection of wisdom or goodness may exist in a thing, it is such as is derived from its conditions.

But yet, notwithstanding this error, some of his observations on the uses of things are worthy of careful consideration, particularly those in which he deals with the "difficulties of pain, suffering, and evil."

He feels that these are adjustments which need to be reconciled with the Power and Benevolence of God, and is too close and just a reasoner not to recognise that, if design exist in the adjustments of the universe, the Purpose of the Creator must be directed to the material or moral uses of these adjustments, such as the support and the well-being of life. Arguing therefore from uses, he very properly seeks for the Purpose of Creation in the adjustments from which he has already inferred design, and refrains from carrying his speculations beyond the horizon of things as we see them. Thus, he finds that pain has a preservative use, and is a stimulus to exertion; and conjectures that so far as the theory of evolution is proven, "want, the struggle for existence, the sufferings which flow from it, and death itself, must, it would appear, be regarded as means to the formation, improvement and adornment of species and races." (p. 250.) Even the permission of evil, he holds, "has been made subservient to the attainment of certain great ends." (p. 257.)



We question, however, if reasoning of this kind can be carried forward to such a point as to justify the general scheme of things. It is certainly true that if life be not kept up to the struggling-point degeneracy sets in, and that the warfare of one form of life against another has profoundly influenced the evolution of species; and it is also true that the death of the individual is an adjustment of utility to the race. But what ultimate good is thereby secured? Granted that these adjustments indicate some scheme of Divine perfection, can we find a place for that scheme in the existing order of things? Are there not boundaries set to progress by the conditions of existence? And will there still be development and progress when, with the lessening heat of the sun, the earth begins to sink down into barrenness and desolation?

Again, we may all be "but parts of one stupendous whole." But in what manner are we to read the significance of the whole? There are, no doubt, conditions which are favourable to life and the higher evolution. Existence implies conditions suitable for existence; and in a progressive evolution the conditions must manifestly be favourable to progress, or it would not occur. But the actual is not necessarily the designed, nor the existent the purposed; and if we do see progress in Nature and in human affairs, of what significance can this progress be, when there are indisputable evidences that all things end in death?

#### § 5. *A General View of the Argument from Beneficence.*

That the actual may be taken to be the designed without regard to the tendency of evolution, and that particular dispositions of Nature are in themselves evidences of Divine Wisdom and Goodness, are errors which we meet with in many teleological speculations, and quite a number of examples of them are to be found in the Appendix to Professor Flint's book.

For instance, our attention is drawn to the fact that the processes which man invents, and the ideas he evolves, have been already anticipated in Nature. Even the idea of extreme and mean ratio, we are told, is embodied approximately in the

revolutions of the planets about the sun, and accurately expressed in the angles at which the leaves of plants diverge as they grow from the stem. But, though this is surprising enough, unless we show cause for belief that the ultimate tendency of things points to God, it does not warrant the conclusions drawn "that man is made in the image of his Creator; that the thoughts and knowledge of God contain and embrace all possible *a priori* speculations of men."<sup>1</sup> The fact in itself, apart from a definite conclusion with regard to the destiny of man, proves nothing more than that a certain relation exists between the mind of man and the universe in which the manifestations of mind have been evolved. The universe is a system of relations, and its phenomena embody definite forms of relation. And we have only to recognise the position of man in evolution, and the power of his mind, to take cognizance of the relations of the universe, to see that in actual fact, and without any implication of design, he is able to arrive, from the basis of his fundamental intuitions, at mathematical relations which he afterwards discovers to be exemplified in Nature. And, in all that is said with regard to "the fitness of the earth to be the dwelling-place and school-house of human beings,"<sup>2</sup> we have similarly left out of sight that the fitness, considered in itself without reference to the tendency of evolution, is expressive only of the actual fact that the earth and its physical organization are conditions to which life has been adapted, and to which it must continue to be adapted in order to live.

Again, our assent is asked to the view that certain previsions exist in the instincts of animals, which are evidential of Divine Wisdom and Goodness. Examples of these previsions are seen in the mammalia who suckle their offspring, the birds that choose the sites for and build their nests, the insects which, subject to metamorphosis, provide for the successive stages of development, and the bees that select food which determines the sex and effects other modifications in the bodies of their

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<sup>1</sup> T. Hill, quoted in FLINT's *Theism*, p. 369.

<sup>2</sup> *Theism*, Appendix, p. 372.

young. In these instincts the animals are guided, we are told, "by some simple appetite, by an odour or a taste";<sup>1</sup> and the assertion is made "that the prevision involved is a prevision which is not in the animals themselves," and which, therefore, must be regarded as designed.

But are we justified in using the term prevision with regard to such facts? In doing so, do we not leave out of sight the operation of natural selection whose selective influence is directed to any action, however slight and apparently unimportant, that is of advantage to an organism?

We are not unconscious, however, that facts may be adduced which place this idea of prevision in a much stronger light. Natural selection implies material for selection; and previsions may very well be thought to exist in some at least of the dispositions of the universe which supply this material, such as where two or more independent lines of evolution conspire, through some common factor, which has not previously been of utility, to produce an arrangement of the utmost service to some need of life. A noteworthy example is the co-ordination of certain digestive and respiratory adaptations to produce part of the organs of speech. In man and all the higher animals the air-passage to the lungs, and the tract of the alimentary canal, have a common entrance through the mouth; and this, so far as the purely animal functions of breathing and swallowing are concerned, might be looked upon as a defect inherited from their remote aquatic ancestors. But when we observe the admirable way in which the arrangement answers to the needs of language in man, in the modification of sounds by the palate, tongue, teeth, and lips, we cannot fail to see that it may be regarded as a prevision of a most remarkable kind. And to this example we might add innumerable others, in which the general course of evolution, while pursuing its path independently of man, has nevertheless established relations of the greatest service to the race of man. Parallel with the growth of life upon the earth, there has been a geographical evolution of the earth,

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<sup>1</sup> The Duke of Argyll, *Cont. Rev.* July, 1875, quoted in FLINT'S *Theism*, p. 385.

resulting in an extreme differentiation of its surface into mountain ranges and wide plains, hills and dales, broad rivers and shallow brooks, indented coasts, land-locked seas and wide oceans; and in the course of this evolution there have also been stored up in the strata of the earth the energies of the past, in vast fields of coal, and the means to make this energy available in rich beds of iron ore. And, undoubtedly, this order of geographical evolution, by diversifying the crust of the earth, and by storing up for him the harvests of the past, has greatly aided man in attaining his present position on the earth, and rendered the conditions of his life less onerous and more enlarged. Again, the horse, the ox, the dog, and all other animals serviceable to man, have each pursued their own line of evolution, and their special aptitudes have all been developed for their own special needs; and yet man's present state of civilization is, in a great measure, dependent upon the services they render him. We may also instance the odour and beauty of the flowers which, evolved with a view to the attraction of the insect tribes, become no mean factor in the evolution of the purely pleasurable emotions of the human mind.

But we cannot, even with all these examples before us, overlook the force of the objection that precisely the same evolution order which produces these apparent provisions, produces also orders of phenomena which are prejudicial to the welfare of man. Every year has its tale of disasters from earthquakes, tempests, and floods; its plaint of misfortunes, dearths, and famines; and its death-roll from plagues, epidemics, and wars. And it is the existence of these which forbids us to see in apparent provisions, or in the general uses and relations of things, direct evidences of wisdom, benevolence, and goodness. Nature, if prodigal of bounties, is also remorseless; the system of evolution is as cruel as it is kind, as passionless as it is benign. Nor do these opposites admit of any reconciliation. We may sum up what at present constitutes our outlook on the adjustments of life, and strike a balance in favour of the wholesome. We may also have regard to the tendency of human endeavour, and see evidence that the harmful is being brought under control. But we mark that boundaries are set to progress

by the general conditions of existence, and the law of the dissipation of energy assures us that in the present order of things universal death awaits the earth.

We may behold beneficent uses in death, but not in the ruthless destruction of life, which has prevailed throughout all geological time, and still prevails. In the strata of every age beds are found surcharged with animal remains, particularly the beds of the Lias formation, where there exists a series of zones, "each of which is characterised by the presence of distinctive ammonites." At the close of the Tertiary period, a general lowering of temperature destroyed many tribes, both of plant and animal life. And at the present time no spring-tide comes, but unkindly frosts and harsh winds nip and destroy the budding vegetation; nor does winter approach without premonitory breathings, that freeze into death the delicate organisms of animal life. Nor is man free. The mortality of the human race, up to the age of manhood, is one-half of the entire death-rate; and the bridge in Addison's "Vision of Mirzah" is but a sad and melancholy picture of the actual waste of human life. Also, if it be true that man is the crown of creation, it is no less true that he is also the most keenly alive to the pains and sorrows of existence. And, though he is individually conscious of the world, he knows that his individuality of consciousness must be withdrawn from the present sphere of things, and that the day will come when the conscious realization of the universe by the successive generations of men will have its end.

If life—this life, for, from our present point of view, we can reason from no other—be the end for which all things are ordained, this ruthless death that buries whole species, cuts off entire tribes, and finally awaits all things, forbids all thought of a benevolent God. If this life be our all, we can see no discrimination in the angel of death: the fever-germ in a bowl of milk makes no distinction between a gambler, whose whole life is that of a parasite, preying upon the industry of his country, and a philosopher, who has thoughts to tell of the utmost value to the human race. And there



is not a terrifying tremor in its shrinking crust, nor an icy blast from its ice-bound poles, but is prophetic of the destruction and desolation that will one day overtake the earth.

§ 6. *General Conclusion on the Argument of Design.*

Relatively to life, there is a want of absolute beneficence in the dispositions of the universe. And if the welfare of life be the end to which all things are adjusted, it is unquestionable that the adjustment is not perfect; and the only conclusion permissible is an atheistic acceptance of the present order of things. We cannot deny to an Intelligent Creator the attributes of Wisdom and Benevolence, without rendering our conception of Him that of a coldly intellectual power, unworthy of our worship and undeserving of our regard. And a teleology so barren as to be unable to predicate more than the existence of an Intelligence, can never be satisfying to the religious consciousness which demands not only a God who creates, but also a God who loves.

The bearing, however, of the facts of the case is altogether changed, and the atheistic position at once turned, if the Purpose of the Creator be not fulfilled in the present adjustments with regard to life. If God have other purposes with regard to man, and all other creatures which suffer, than what pertain to their present state of being, and if the present order be merely the preparation for another order, then the nature of this final Purpose must be brought in as a determining factor in our view of present conditions, and the mischances of life, and death itself, become of no account with regard to the Attributes of God. If the Purpose of God be directed beyond the present sphere of things, however incapable we may be of judging how pain and evil are related to the state of things as we see them, we have no right to raise objections from them to His Beneficence or Wisdom.

And this brings us into view of the cardinal error of the natural theology which builds upon the argument of design. In its ignorance it has presumed to enter in where angels fear to tread, and declare that in the visible order of things we see



fully the End and Purpose of God in creation. But if there be one lesson more than another which evolution, and the revelation that the universe has a history in time, have to teach, it is that the Purpose of God, by the very nature of the case, cannot altogether be discerned in the things of time, when the Purpose is as yet unfulfilled. And if, neglecting this teaching, we look for secondary purposes and designs in the changing phenomena of time, we can expect nothing else than to have our conclusions questioned by inferences from such phenomena as are opposed to the purpose or design we imagine ourselves to discern.

Evolution can only tell of God, if we are able to discern a Purpose in the trend of evolution. And this Purpose will never even partially reveal itself, so long as we continue in the light of evolution to look upon the universe in the pre-evolutionary way as an assemblage of finished products. Nature is not a product, but a process; and not until we put away all thought of it as a product of bare creative Energy, and regard it as a Process of God, working out the Purpose of God, shall we find ourselves on the lines of a true teleology. Not by tracing the adaptation of means to ends, nor by reasoning from the order and adjustment of things to an end, but by inferring the end from the nature of the processes that lead towards the end, can we hope to determine whether the order of evolution justifies belief in a God Who is the Creator and Conservator of all things, the Source and Maintainer of the universe, the Father and Preserver of the race of man.

## CHAPTER III.

### A PRELIMINARY CONSIDERATION OF THE ORDER OF EVOLUTION.

#### § 1. *The Significance of the Process of Nature.*

THE scientific spirit is so exclusively occupied with the formation of inductions by the methods of observation and experiment, and so fascinated with the evidences of order and unity which it discovers, that it is seldom alive to the truth that equally with the religious sentiment it is under the direction of a fundamental intuition of the human mind. The fact is, there are no scientific truths which do not ultimately rest upon the conviction of the related nature of human experiences; and the most fundamental scientific conception of the universe—a conception which is not the laboured result of induction, but intuitional—is that of an assemblage of related things external to the mind. Governed by this fundamental conception, all that science has done has been to build up into it definite conceptions of the relations of things as they are found to obtain in experience; and the aim of all science is to arrive at the definite general conceptions which shall harmonize the world of experience with the conviction of its related nature.

And as science arrives at definite general conceptions of the universe, religion steps in to interpret by means of them the religious significance of the universe. Moreover, only in proportion as science realizes with clearness and fidelity the objects of experience, and discriminates with accuracy and fulness the general relations of the universe, can religion give to them a trustworthy interpretation. The failures in the past to behold with opened eyes the true order of

the universe have been the true cause of the failures to interpret it.

All objective experience implies the reality of the object perceived, and the conviction of its related nature; and, taking these for granted, we proceed by scientific methods to unfold in the world of experience the order in which things are related. Our fundamental scientific conviction, however, gives us no key to the right discrimination of this order. It is only by slow and laborious steps that we have emancipated ourselves from imperfect and mistaken notions, and reduced our experiences to a true order. And our religious interpretations, following in the wake of our scientific ideas, have passed through similar stages of imperfect apprehension. For ages Nature presented itself to us in an enigmatical maze of phenomena, and religion was left free to colour with the emotions the things of sense. Again, when we had begun to spell out the meaning of Nature, we thought only of the explanation of its immediate presentment; phenomena, as they entered into immediate relation with our own life, and not as they were related to each other, dominated our thoughts; and at this stage of scientific apprehension, religion could not do otherwise than interpret all things as directly proceeding from God. When, again, with increase of knowledge, we had learned that phenomena were the effects of forces, we judged the forces to be secondary in importance to their effects, and were not prevented by the knowledge that phenomena were conditioned from regarding the conditions in the light of the phenomena conditioned; and religion at this stage, naturally enough, busied itself with the argument of design, and proofs of the beneficence of the plan of creation. Not until our ideas of the universe were so matured as to catch sight of the principle of continuity, did we begin to perceive that the universe is to be regarded from the point of view of the forces, and not of their effects, and that phenomena are to be considered merely as phases of the conditions; and corresponding to this stage of scientific thought, we have in the sphere of religious interpretation the gradual displacement of the argument of design by that of order and adjustment. There is need, however, of

further progress. Men are slow to shake off the idea that Nature is a product, and awake to the conception of it as a process. That Nature is a process is the only view of it which is consistent with the conception of its continuity. And if, in the present age, with a view to give a fitting interpretation of it, we would carry over, from the scientific conception of things into the religious conception of things, the ripest and most advanced conception of the universe, we must realize Nature to be, not a product of order, or a system of arrangement, but a process instinct with purpose.

First perceived by mathematicians in connection with number, the principle of continuity has in successive stages been applied to the elucidation of physical problems, and found to obtain throughout all the changes of the physical universe. And with the enunciation of the doctrine of evolution, it has become of even still wider application. Not only the physical sciences, but also those of life and mind, are now known to be continuous; and evolution, as an extension of the principle of continuity, assures us that throughout the history of the universe the successive phases of phenomena have succeeded each other, under certain inviolable conditions, with the regularity of an unbroken mathematical curve. No event has occurred unconnected with what has preceded it, or unconnected with what has followed it; and the order of the universe is that of a system of change in accordance with fixed conditions, whereby the present is the outcome of the past, and Nature is seen to be not a completed product, but a process.

It is a purblind reading of Nature, however, which sees in the process of Nature nothing more than a continuity stretching illimitably from the past and into the future. The principle of the continuity of Nature is the law of connection between the phases of phenomena; but over and above this law of connection there is definite direction and progressive movement in the order of successive phases, which give a character to the universe and a meaning to its evolution. In the solar system, for instance, the continuity of phenomena is traceable backwards from the orbital motions of the planets and their secondaries round the sun to the slow rotatory motion of a

nebula of continuous vapour, or of colliding meteoric masses ; but over and above this continuity we mark the definite direction of the law of gravitation towards the integration of masses of matter, and trace out the progressive movements which under gravitation give character to the system and determine the course of its evolution. Similarly in the universe at large. The process of Nature is not an endless chain of uniform changes, but is in every part of it full of significance from the past and suggestiveness of the future ; and the course of evolution is not a cold and expressionless procession of events, but a mighty drama, warm with the pulsations of life, and glorious with the progressive revelation of Purpose.

It is this Purpose in evolution which we seek to determine. And the principles which prevail in the order of evolution, and conspire to give character to the universe, are the data on which we must proceed. And in this chapter we have before us two lines of inquiry ; first, how far our knowledge of these principles is adequate for the determination of the character of the universe ; and second, what is the nature of the argument they enable us to sustain.

## § 2. *The Adequacy of our Knowledge to interpret the Universe.*

The right discrimination of the factors, which are of determining value in the character of things in general, is a matter beset with many and grave difficulties. The imperfection of our knowledge of a thing may cause us to confuse the essential with the non-essential ; and our ignorance of its relations to other things may so far mislead us that we may mistake for internal and characteristic what are really external and derivative ; and also, in addition to these, there are numerous other difficulties which arise in tracing out the exact relations between character and action, principles and their resultants. In the determination of the character of the universe, however, these difficulties are greatly minimised by the fact that the simplicity of the operations of Nature, and the uniformity of their action, enable us to arrive at the general principles which prevail in Nature, with a precision which is



unattainable when seeking for the principles which prevail in the characters of things in general. Nature presents us with no problems so perplexing as those we meet with in human affairs. We are not fettered by individual marks and local colourings ; and, although our knowledge of the principles which obtain in Nature has in many cases to be gleaned from very imperfect data, and in some cases to be constructed amid clouds of speculative fancies, so much is known that the general order of the universe is fairly discernible.

Much is hypothetical, and we are far from being able to read with accuracy the past history of the universe. But it is not necessary for the discernment of general principles that we should be free from hypotheses, and able to read in every particular the history of the past. And one of the most important results of the change in our point of view of regarding the universe, is that we are no longer dependent on that direct testimony of clear and undoubted facts which was essential in the interpretation of the universe as a finished product. So long as the character of the universe was judged according to the evidence of the dispositions which obtain in it, and little or no account was taken of its history, the testimony of clear and indisputable facts was essential to its interpretation ; but with the change in point of view to that which looks to the testimony of the history of the universe as in the main degree determinative of its character, a change of attitude also takes place with regard to the nature of the evidences which are admissible. Evidences of character, derived from the dispositions of the universe, are evidences from clearly ascertained facts ; and the principle on which we receive them is that they are consonant to the facts of the case. Disprove the existence of the disposition, or make manifest that the conception taken of it is not what it ought to be, and the evidence vanishes. It is not so, however, with the testimony of the history of the universe. Here the evidence is derived, not from facts, but from the conditions which give rise to the facts ; and, provided that we can come into view of the conditions, precision in the view of facts is not material to the testimony.



We must, of course, bear in mind that the principles of evolution are themselves derived from inductions with regard to facts, and that where facts are not obtainable no principles can be proven. But for this it will be sufficient if we are attentive to the distinction between philosophical speculations with regard to principles, and scientific hypotheses with regard to facts. The former must be rejected, the latter are under certain circumstances admissible.

The state of the case is this. Certain phenomena are observed to occur in Nature; and the doctrine of evolution proceeds on the postulate that these phenomena are the resultants of determinate conditions of evolution. And though we may not speculatively assume these conditions to be other than what are to be inferred from the facts of the case; yet, when from the general body of facts we are able to build up an hypothesis with regard to their evolution, the possible errors of which are clearly perceived to be confined to subordinate details, and not to extend to errors in the conditions, such an hypothesis has a distinct scientific value and may legitimately be admitted into our reasoning. Let us take, for instance, the evolution of the chemical elements. From various indications, of which one of the chief is the nature of the relations which they are observed to hold with regard to each other when arranged according to Mendeléeff's Periodic Law, we are well assured that the elements have been evolved. And from the data which are given to us in the elements themselves, and in the conditions under which they are known to exist, we attempt to hypothetically determine the course of their evolution. Very probably the sketch we give is, for the most part, erroneous; but the fact that they have an evolution, whose general principles can be predicated, may nevertheless be assured.

The principles of evolution admitted into our reasoning must be assured scientific truths. And though we may not take for granted philosophical pre-suppositions with regard to principles, hypotheses with regard to matters of fact which depend upon known and definite principles are not lightly to be disregarded. These may decide many questions which it

is impossible for us to avoid; and, indeed, whenever it is clear that the possible errors are not in the principles of evolution, but in the application of the principles to the elucidation of the precise order of facts, hypothetical views have a real value as more or less illustrative of the character of the universe. In many matters they are our only guide; and if we refuse their testimony we put ourselves in the position of a traveller who, forced to journey by starlight, bandages his eyes because he cannot have the light of the sun.

### § 3. *The Darwinian and Spencerian Schools of Evolution.*

And the distinction here made between the value and use of speculative principles of evolution on the one hand, and of scientific hypotheses with regard to facts on the other, is of great service in determining our attitude towards the conflicting schools of evolution.

The evolution doctrine is indissolubly associated with the labours of two masters of thought, Charles Darwin and Herbert Spencer, who represent different schools of evolution, the scientific and the philosophical. Darwin, by his patient investigation of Nature, has placed upon a secure foundation our knowledge of the growth of life upon the earth; and Spencer, by his speculative insight, has exercised a powerful influence in widening the conceptions of men. By the one evolution has been sagaciously elaborated in the form of the theory of natural selection as accounting for the manifold adaptations of living organisms, and by the other it has been ingeniously propounded as a process of the widest range prevailing in all the phenomena of the universe. To both men we owe the fact that its doctrine dominates modern thought. But while Darwin, on the one hand, proceeds by the cautious method of scientific induction, and advances the law of natural selection on the same ground of inference from observed facts as the nebular hypothesis is advanced to account for the evolution of the solar system, and the uniformitarian views in Geology set forth to prevail in geological change, Spencer, on the other hand, starts with

certain philosophical postulates, and constructs a speculative view of the universe, in which a few first principles are first asserted *a priori* as prevailing in the laws and operations of the universe, and afterwards exhibited *a posteriori* as probable from the general testimony of the order of Nature. With Darwin the doctrine of evolution is a scientific induction, with Spencer it is on the one side a philosophy and on the other a speculative history of the universe. And an important distinction between the two schools of evolution, of which they are respectively the exponents, is that Darwin, and the scientific evolutionists in general, refuse to accept any principle of evolution not supported by the general body of facts, while Spencer, and the other evolutionists of the philosophical school, incline to admit into the processes of evolution speculative principles and laws as conceivably explanatory of the order of events.

However meagre, therefore, and ill-defined may be the outlines of evolution given in accordance with the Darwinian method, when compared with the elaborate and detailed picture presented to us in Spencer's system, it is to the school of Darwin that we must look for a faithful portraiture of the order of evolution, free from those speculative hypotheses which affect the principles of evolution. And, though there is much in Spencer's system which is suggestive, our attitude towards it cannot be other than one of reserve. No principles can be introduced into our reasoning but such as are scientific truths, and no hypotheses can be regarded which presuppose other than assured principles.

#### § 4. *The Order of Evolution.*

In the evolution order the fact of chief importance to be recognised is that, corresponding to each of the great orders of phenomena presented to us as coexisting, we have an order of evolution presented in time. We perceive in the universe a physical order of matter subject to its own law of physical interchanges, a protoplasmic order of life exercising its own activities and reproducing its like, a psychological order of mind manifesting itself in feelings, thoughts, and

volitions, and a spiritual order of personality exercising itself in the acquisition of knowledge, and manifesting various sentiments and activities. These orders, without pledging ourselves to the teleology which is commonly thought to be involved in the terms, we distinguish as the orders of matter, life, mind, and spirit. And all four, in addition to their coexistence, have also an evolution in time. In matter we have a physical evolution which began with the birth of the chemical elements, and has progressed through the formation of the worlds to the production of the various forms of matter and cycles of physical activity. In life we have a protoplasmic evolution which originated in protoplasm, and has proceeded through the combinations and modifications of the protoplasmic cells to the establishment of the innumerable adaptations of plant and animal life. In mind we have a psychological evolution that began with pleasures and pains, and rudimentary sensuous perceptions, and has progressed through various degrees of instinct and intelligence to the perfected intelligence of man. And in spirit we have a fourth order of evolution, wherein the human personality is projected outside of itself, and enters into relationship with outward things.

These four orders of evolution include all that we can know respecting the universe; and from their consideration we are to formulate, on the principles we have indicated, our evidences of the character of the universe, and construct our argument.

And, with reference to our argument, it will be of advantage in directing our thoughts to the proper point of view, to briefly discuss one or two general questions, concerned with the direction in which our principles can be applied, and with regard to which teleological speculations of a more or less polemical nature have already been broached.

### § 5. *The Question of the Origin of Each Order of Evolution.*

Each order of evolution starts from the point at which the properties, subject to evolution in each, appear above the horizon in time; and the first question to which we direct

attention is that which is concerned with the origin of each. Matter, life, and mind, apparently jump each into existence with attributes and powers clearly distinguishable from anything that has preceded them, and presumably in contravention of the principle of continuity. And a very popular argument, with those who dabble in natural theology, is to set nothing and matter, matter and life, life and mind, in sharply defined contrast to each other, and insist upon their differences as demonstrative of a break in the continuity of Nature, and evidential of the direct operation of a Creative Will.

But this argument, as generally conducted, yields at the most nothing more than a negative presumption in favour of the direct intervention of a Creator. No attempt is made to reason from the connection, which must exist, between the ultimate principles that prevail in matter, and those that prevail in life or mind; and it is incontinently assumed that if the principle of continuity be not sufficient to explain all that is met with in the universe, there can be no other formative power or principle than God Himself. In fact, the argument is made to proceed entirely on negative premises; and it is needless to say that the inference of a Creator in such a case is possible only to a mind prepossessed with certain ideas of a Divine Being, and with certain assumptions with regard to the manner in which a Creative Will necessarily acts. And commonly we find that those who make the inference are those who have suffered themselves to be betrayed into the adoption of the opinion that the general laws of Nature shut out the direct operation of God. The strange, the inexplicable, the disconnected, the unconditioned, these are the marks which they think to be demonstrative of the finger of God; and the commonplace, the intelligible, the continuous, the conditioned, these are the signs which indicate to them the secondary and derivative, in which the action of God is only indirectly to be seen. But how do they know that the continuity of Nature is not a very abiding Act of God? And what assurance have they that the discontinuous, if it occurs, is other than a result, direct or indirect, of an interference with His Plan?



And, even if the argument were rationally conducted, and an attempt were made to reason from the connection between the root principles which prevail in matter, and those which prevail in life or in mind, we question if any truths of an interpretative kind could be arrived at. The question of origins is strictly a philosophical, and not an interpretative question. It concerns itself not with the definite and assured relations of things which science discloses, and which must form the basis of every interpretation of the universe, but with the nature of certain root-relations which cannot be elucidated by the methods of science; and whatever truths it arrives at, these are not interpretative truths, but barren, philosophical truths, which yield to religion even less than what is contained in its fundamental intuition of God.<sup>1</sup>

And here we may note that, opposed to the theistic speculations on the origin of things, there is a great display of antitheistic speculation, which, professing to be scientific, is not less extravagant in its nature. In these antitheistic speculations the continuity of Nature is taken to mean the continuity and universality of a single mode of operation, under which all things whatsoever are capable of being brought; and the order of evolution is interpreted on the supposition that in no order of evolution is there operative anything more than the principles of the previous evolution. Force, we are told, is the ultimate principle of all things; all action is in the line of least resistance; life is a play of forces, and thought a mode of motion; and laws analogous to physical conservations are even asserted to obtain between the ideas and emotions of the mind.

There can be no question, however, but that these speculations are founded upon an erroneous view of the universe. The principle of continuity, no doubt, so far prevails in the universe, that appropriate conditions are required for the manifestation of each order of evolution. Each order presupposes the evolution of the preceding orders, and exists only under the conditions imposed by them. Matter, indeed, cannot be understood otherwise than as derived from something

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<sup>1</sup> See Appendix, § 4.



unknown which lies behind it. But protoplasm, the basis of all life, is built up of chemical elements, and is so far a product of the evolution of matter; and the protoplasmic evolution, in turn, depends upon the supply of energy, and demands for its continuance a high degree of physical stability united to an extremely delicate equipoise of physical relations. Mind also is manifested only through the nerve-cells of the brain, and so far pre-supposes a certain order of adaptation in the forms of life. And the spiritual attributes of man further postulate a definite order of manifestations of mind as necessary for their exercise. Yet there is nothing in all this which outweighs the testimony of life and mind to the fact that they are each new determinations on the part of some principle in the universe as ultimate as that to which we owe matter and the forces which reside in matter. The activities of life are clearly distinguishable from the operations of force; thought, also, is incapable of being understood in terms either of life or force. And if the crude creationism, which ascribes all that is inexplicable in the universe to the immediate action of God, is to be rejected as a speculative fancy, the philosophical monism, which asserts force to be the be-all and end-all of all things, must be equally rejected as no less fanciful.

### § 6. *The Question of a Creative Intelligence.*

We next invite attention to a question which has implicitly been more or less before us throughout the preceding chapter, namely whether from what is observable in the processes of evolution we may conclude the universe to be the work of a Creative Intelligence?

A general view of the evolution of the universe brings under our notice the remarkable fact that the plan and process of evolution have a marked similarity throughout all four orders of evolution. In each order there are a few root-properties of the order which remain unchanged throughout the process of the evolution, and which, together with the external phenomena with which they enter into correspondence, determine the scope and limits of the evolution. We recognise in matter

the root-properties of the atom, its gravitative, molecular, chemical, and electrical effects, by means of which are manifested the energies resident in the universe, and by the various transformations of which the order of the physical evolution is built up. We perceive in life the functions of assimilation, reproduction, and movement, marking protoplasmic life wherever it occurs, and prevailing, though sometimes in a masked form, under all the adaptations which plant and animal life assume. We mark in mind, feeling, thought, and volition, as characteristic of every manifestation of mind, the simplest as well as the most complex. And finally, in the spiritual attributes of man we notice the projection outside of itself of the human personality in the four main directions of the love of knowledge, the æsthetic sentiment, morality, and religion.

These root-properties of the various orders give rise in each particular order to the characteristic features of the evolution; but the process of evolution, consisting essentially in the formation of relations, is the same throughout; and in all four orders of evolution the same progression, from the formation of less to the formation of more complex relations, takes place, as the root-properties in each case separate on the principle of the division of labour, and come into more extended relationship with their external surroundings. The material atom, the protoplasmic cell unit, the perceptive mind, and the human personality, are each placed in certain circumstances; each proceeds to form more extended relations with the circumstances in which it is placed; and the relations formed become conditioning factors in the formation of further relations; and there eventually ensues the highly complex order of relations which marks the present aspect of the universe.

And in this process of evolution there is a marked and close analogy to the manner in which relations are formed by man. Man brings about an adaptation of means to an end by laying hold of certain properties of things as means, and bringing them gradually, as experience teaches and unfolds the methods of arriving at the end, into such relations with other things as are best fitted to secure the end. And the

results of the discriminative process, thus applied by man to sift out and seize the relations which secure the end, are in substantial agreement with the results of the processes which obtain generally in the universe. Man, in the evolution of his contrivances and appliances, repeats the process of the evolution of the universe, and the same general process of evolution prevails, carried out on the one part as a work of intelligence, and on the other as an operation of Nature.

For instance, the steam-engine is a contrivance by means of which the energy of heat latent in steam is converted into mechanical motion to subserve the needs of man. The engineer makes use of a relation existing in the universe, the passage of heat from a hotter to a colder body, to attain other relations fitted to his purpose. Limitations, however, are placed upon him by the necessities of the case, and, starting from certain adaptations of an elementary kind, he endeavours to construct an effective and economical engine, particularly adapted to the kind of work he wishes to have done. Hence, along the first and earliest line of the evolution of the steam-engine we had the adaptations of the flue, the boiler, and other contrivances for securing the safe passage of the heat. Steam-engines at that early date were, however, merely pieces of apparatus in which steam was both the motive power and the direct agent of the work done. The property capable of evolution was laid hold of, but the adaptation to convert the apparatus into an engine had yet to be effected, and the true line of evolution to be originated. This was done in a second stage of evolution, on the principle of the division of labour in generating the power by steam, and utilizing it to drive a separate piece of machinery. And in the earliest engines, properly so called, a beam suspended as a lever was attached to a piston working in a cylinder at one end, and a pump-rod at the other, and what had previously been a piece of apparatus became a train of machinery. A valve gear for controlling the supply of steam was then introduced, and steam engines began to be of practical utility for the drainage of mines, and securing the water supply of towns. The cost of working, however, at this stage was enormous, and much interfered

with their general use. The line of evolution had been entered upon, but economy of working had still to be attained. The chief waste was in the loss of heat by the cooling of the cylinder in which the steam was condensed, and this was obviated by the illustrious Watt, who attached to the cylinder an exhausted receiver, into which the steam rushed, and was condensed outside the cylinder. Further improvements in the economy of working were also made by cutting off the supply of steam at the quarter-stroke of the piston, so as to permit of the action of the expansive power of the steam, and by attaching a fly-wheel to counteract irregularities of motion. There were also constructed, in place of previous rude and insecure contrivances, suitable devices for guiding the head of the piston-rod, so that it preserved its motion in the vertical line, and the throttle-valve and governor for regulating the speed of the engines were also invented. The crank was used to attain rotatory motion, and the now general double-acting engine, in which steam is admitted into the cylinder alternately on each side of the piston, was introduced. And the Watt period of invention ended with the evolution of all the various forms of engine fitted to particular work, such as the pumping engine, the rotatory, the trunk, the oscillating, the compound, and the locomotive. The adaptation of the steam-engine to effective working was, at this stage, fairly completed, and the next step in its evolution as a useful agent of man was in the development of a third series of adaptations, that took their departure from the modification of the point of support of the engine, fixed in stationary engines, but required to be movable in locomotives. Road locomotives, in which the point of support was found in the friction between the wheels and the road, were used in the early part of the present century in the neighbourhood of London ; but after a short trial, in which they attained fair success, they yielded to the more effective railroad-engine. The railroad itself is an adaptation evolved from the squared-timber tramways used in the North of England early in the seventeenth century for the transportation of coal, to which there succeeded in the next century angle-bars of cast iron arranged on transverse wooden sleepers of timber. And at the

beginning of the present century the steam-engine and the railway were both sufficiently advanced to afford the basis of a successful alliance. That the friction between the rails and the wheels of a locomotive, due to the weight of the locomotive, was sufficient to yield a fulcrum for the drawing power, was demonstrated by William Hedley, and the successful introduction of the locomotive by George Stephenson established the steam-engine as the great travelling agency of man. Similarly in the propulsion of vessels through water, the paddle-wheels and screws were old appliances, to which steam-engines had only to be adapted for effective work to be done.

In the development of the steam engine there has thus been, in a manner strictly parallel to what we find in Nature, a progress from the less to the more complex, as relations with external things became more extended. And the general question suggests itself, whether this parallelism between the process of Nature and the labours of man can be carried a step further, so as to ascribe the relations which are established in Nature to the same cause as the relations established by man. The intelligence of man discovers certain root-relations, and establishes by means of them relations with other things suited to human needs. And may not the root-relations of the various orders of evolution, and the establishment of further relations by means of them, be the work of a Creative Intelligence directed to certain ends? Intelligence is known to be the cause of the relations formed by man, because the intelligence of man is the co-ordinating factor of the relations; and may not intelligence be also the cause of the relations existing in the universe, because the formation of its relations involves the exercise of a like co-ordinating power?

The mind "masters forces which exist in the outer world," says F. E. Abbot, in his *Scientific Theism*, "and constrains them to produce relational systems which have absolutely no origin but the understanding itself." (p. 146.) Thus a ship, "as a ship, is the teleological creature of the understanding alone"; and he concludes that it is an attribute of intelligence "to discover or create relational systems or constitutions"; and further remarks that "no other origin of relational



systems is either known in experience or conceivable in hypothesis." (p. 151.)

But unless we are to couple with this teaching the further teaching that the relational system of the universe is directed to an end, and reveals a purpose, we question if it can withstand criticism. We may philosophically regard final causes as residing in the inherent order of things; but the legitimacy of all reasoning with regard to final causes, as applied to the facts of science, lies in the perception of an end. And in all reasoning with regard to the manifestation of an intelligence in the relational system of the universe, unless we can perceive an end we are irresistibly carried into the region of mere speculation, and re-introduced to the discussion of origins. This will be clear when we have looked a little more closely into the matter.

In the relations of the universe regarded as possibly due to the operation of an Intelligence, there are two points which engage the attention—the interdependence of the relations and the evolution of new relations.

And considering the interdependence of the relations, we observe that relations in Nature are defined and limited by their conditions. Iron, for example, at ordinary temperatures is strongly magnetic; but when the temperature is such that the iron is red-hot, the magnetic properties disappear, to re-appear again, however, when the temperature is lower and the iron has cooled. Also under certain pressures liquids become solids, and gases liquids; and on the removal of the pressures the original states are restored. And, therefore, unless we can infer the end and purpose of the conditioned relations, we are forced back for our signs of intelligence upon the relations manifested in the conditions, that is, in the origins of things. For instance, we may refer all the relations established in the adaptations of plant and animal life, with regard to obtaining food, digesting it, and assimilating it, to the conditions existing in the assimilative property of protoplasm, the existence of a food supply in Nature, and the laws whereby the assimilative property becomes adapted to secure, in modified ways, a supply of food. But these conditions,



so far as they are not in themselves original relations, are the outcome of other conditions; and so, ultimately, our search for the co-ordination of the relations is carried back to the points at which we observe a breach of continuity, and the question of origins is forced upon us.

Again, considering the evolution of new relations, and inquiring into the possible cause of the process whereby from one set of relations others are evolved, we note that we cannot argue, on any ground of true analogy, from the operation of the intelligence of man to the operation of a Creative and Ordering Intelligence. We must not forget that the office of intelligence in originating adaptations is not creative but inventive, and that the relations established by man are potentially existent in the existence of the conditions from which they are derived. All that we know from experience is that intelligence perceives certain relations, and infers the possible existence of other relations. Our experiences teach us nothing whatever as to its office in the creation of relations, whether by way of evolution or by way of original creative fiat. The question of the creation of relations is practically a question of origins, and this question, as we have already said, carries us beyond the range of the assured truths which must be the basis of every interpretation of the universe.

### § 7. *The Laws of the Orders of Evolution.*

Neither the discussion of origins, nor an inquiry into the means whereby relations have been established in the universe, yields us a sure ground of argument. Though we may, from the independence of the root-properties in each or in any of the four orders of evolution, infer the existence of a formative principle by virtue of which certain root-relations are originated unconditioned, in all essential respects, by the previous order of evolution; and may also, from the additional evidence that the process of evolution is persistently directed to the establishment of more extended relations, infer the unchangeableness of the operation involved in the evolution processes; we are not in a

position, unless we can discern the end to which evolution points, to infer that either the formative principle or the process of evolution involves the exercise of an Intelligence.

Our argument requires that we shall discern an end. And the enquiry into the mode by which relations are established in the universe in no way advances us towards the discernment of an end. For evidences of an end we must look towards the laws of the orders of evolution, and the scope and tendencies of the resultant processes. And we proceed therefore to determine in what direction we are to look for these laws, and how far, when found, they will assist us in our argument.

If the view of evolution which we have unfolded in this chapter be correct, and we be constrained by the facts of the case to view each order of evolution as arising from the formation of relations between certain root-properties of the order and the circumstances in which they are placed, it follows that the law of the evolution in any order must be independent of the processes of evolution which take place in that order: each order of evolution is evolved under fixed conditions; and these conditions, of which the law is the expression, are manifestly antecedent to the phenomena conditioned. To determine, therefore, the law of the evolution in any order, we must turn to the antecedents of the order, and there seek for the controlling conditions of the order. And we surmise that the law of the evolution is to be found in one of three spheres:

- (1) In the root-properties of the order, or
- (2) In the circumstances in which these root-properties are placed, or
- (3) In the connection between the root-properties and their circumstances.

And if in any order of evolution we find a law, which is general in its operation and which pertains to one of these three spheres, we have a fair presumption that it is the law of the evolution. The precise location of the law, of

course, can only be determined from the facts of the case in each order; and no *a priori* rule can be given for our direction.

And here we remark that we must carefully distinguish between the law of the evolution, and the secondary laws which arise in the evolution process. A law which pertains exclusively to the properties of the things evolved, or to particular relations of the evolution order, is in general a secondary law, and in no way necessarily connected with the law of the evolution. For instance, in the evolution of the steam-engine, the two well-known laws of heat and the principles of mechanics prevail throughout, and must be observed by every engineer who endeavours to improve the steam-engine; but these laws are only secondary laws, arising out of the nature of the properties made use of by the engineer, and for the law of the evolution we must look beyond them to the co-ordinating power of the mind of man, and the supply of energy available for conversion into mechanical motion. Similarly, in each order of evolution we must distinguish between the laws which prevail in the properties of the things evolved, and the more general law which is the controlling condition of the evolution itself.

And, provided that we are able to come into view of the law of the evolution in any order, we shall find that from its very nature this law alone is determinative of the scope and tendency of the evolution. No consideration of secondary laws can reveal to us the full scope and tendency of the order of evolution to which they pertain. They condition only the relations of which they are the law; and the general evolution may continue its course far beyond their influence. But the law of the evolution conditions every relation, and to whatever end the process of the evolution points it is an end which is conditioned by this law. And here, again, we find illustrative material from the evolution of the steam-engine. The evolution of the steam-engine is, from the point of view of the secondary laws, conditioned by the nature of the materials used, and by the forces called into requisition. We can never in the effectiveness of the

engine transcend the condition that heat never of itself passes from a colder to a hotter body; and this therefore must be taken as limiting the advantage which can be obtained by means of the engine; and similar limitations likewise arise from the strength of the materials and the nature of the mechanical appliances made use of. But from the point of view of the law of the evolution, we discern that the mind of man is continually engaged in seeking to utilize to higher and higher degrees the energy of the universe. By various discoveries many improvements have been made in the steam-engine, both in the economy of working and in the effectiveness of the work done; and it is not improbable that by some new discovery heat itself may be altogether discarded in favour of some other agent of more service. Practically, then, we conclude that the evolution of mechanical appliances, such as the steam-engine, is conditioned, not by the forces and materials in actual use, but by the intelligence of man and by the stores of available energy, that is by the law of their evolution. Similarly in the universe at large, the scope and limits of any order of evolution are determined, not by the secondary laws, but by the law of the evolution; and the knowledge of the law will give the key to the interpretation of the evolution.

It is to the laws of the four orders of evolution that we must look for the interpretation of the universe. And from the investigation of these laws we shall find that the possible interpretations of the universe limit themselves to two; and that the problem presented to us is that of the universality of the physical order established under the law of the physical evolution.

At the base of all evolution lies the evolution of matter; and the law of the evolution of matter is the law of the distribution of energy. Whatever changes take place in the physical universe, they are changes in the form of an energy which remains constant in quantity. This conditions every change; and gives unity to the order of the physical universe. Every change in matter is subject to this law; and every

physical process is determined by it. And the determination of the main question of natural theology turns upon the question of the all-sufficiency and universality of the order which the physical law establishes. Wherever matter is, this order is. And the problem before us is to ascertain if in the other orders of evolution there are phenomena over which the physical order does not prevail, and which have a law of their own independent of it and pertaining to a spiritual order.

## CHAPTER IV.

### THE LAW OF THE PHYSICAL EVOLUTION

#### § 1. *The Unchangeable Order of the Physical Universe.*

IN each order of evolution there are a number of root-properties which, under the law of the evolution, enter into extended relation with the circumstances in which they are placed, and build up the evolution. And the natural method by which to arrive at a knowledge of the law of the evolution is obviously to begin with an examination of the relations between these root-properties and their circumstances. But, in the evolution order of matter, which must first engage our attention, and which precedes in point of time all the others, the circumstances in which the root-properties are placed are discernible only from the general view of the evolution itself; and the advantages of the natural method are not in this case ours to command. In this order of evolution, therefore, in place of examining methodically the progressive stages of the evolution, we must be content to work backwards and, reading the past of the physical universe in the light of its present, seek to arrive at those elements which, remaining constant throughout its history, embody the conditions of its evolution.

The experience of man, from the first moment when he began to build up his knowledge of the universe, has been steadily confirmatory of the fact that the phenomena of the physical universe are dependent on conditions which are not influenced by the lapse of time. Thus, when Hipparchus discovered the precession of the equinoxes, Archimedes the principle of the lever, Kepler the elliptical orbits of the planets, Galileo the principles of the motion of falling bodies,



Newton the law of universal gravitation, Young and Fresnel the undulatory theory of light, Fourier the theories of the conductivity and radiation of heat, Dufay the two kinds of electricity, Faraday the theory of inductive action, Dalton the atomic theory, and Joule the law of the conservation of energy, facts and generalizations of facts became known which, true at the time they were discovered, had remained true from their first existence, and will remain true while the present constitution of the physical universe endures.

Further, the various physical sciences which the labours of these men and others have built up by observation and experiment, also bear testimony, each in its own particular sphere, to the unchangeable order of the physical universe, and to the fact that its varied and varying phenomena are the determinate effects of unchanging general conditions. Thus we have the sciences of mechanics and astronomy, in which we view the various motions which pertain to matter and the aggregation of matter into suns, planets, nebulae, comets, and meteorites, as the resultants of two conditions; that of motion, in which each substance receives or imparts motion according to its original and unchanging capacity for motion as expressed in its atomic weight; and that of universal gravitation, under which every particle of atomic matter in the universe attracts, and has always attracted, every other particle according to the well-known law of the product of their masses, and the inverse square of their distances. We have also the science of heat, in which we trace the distribution of heat as determining, in conjunction with mechanical pressure, the states of a body, whether gaseous, liquid, or solid, and its properties pertaining to these states; the science of chemistry, in which we refer the changes that take place in the constitution of bodies to the properties of a number of unchanging elementary substances; and the sciences of electricity and light, in which we conceive electrical states and motions and the varied phenomena of light as dependent on certain connections between atomic matter and the matter of space, manifesting themselves in lines of force and vibrations.

And this principle of the unchangeable order of Nature,

which we establish from our continued observations of phenomena, is further confirmed by our knowledge of the past history of the earth. The secondary conditions, such as winds, rains, pressures, etc., which come into operation on the earth, are the known resultants of the primary conditions of motion, heat, chemical action, and light; and from the evidence presented to us in the strata of the earth, we infer that these secondary conditions have operated in the past the same in kind, though probably not in degree, as now. From the earliest ages the rains have fallen, the rivers flowed, and the debris of the hills been deposited in the river valleys and estuaries; the gradual crust-movements have alternately raised the land above and lowered it beneath the sea in particular localities in past time, as at present; and the long continuance of pressures, such as we see to be now exerted, has, in the past, consolidated the rocks, and in alliance with heat metamorphosed their character and constitution. The whole science of Geology, in fact, rests upon the principle of the uniformity of the operation, throughout all geological time, of these secondary and resultant conditions; and is in itself a direct testimony to the unchangeable order of the physical universe.

And as atomic matter, wherever it exists, in nebulae, suns, planets, comets, or meteorites, obeys the same law of gravitation, is governed by the same laws of motion, manifests the same phenomena of light, and possesses the same order of chemical constitution: we are at liberty to infer that the same unchangeable order, which our experience teaches us to prevail with regard to the earth, and which our knowledge of the past history of the earth confirms, prevails everywhere, and has conditioned every change of state which matter has undergone.

### § 2. *The Evolution of the States of Matter.*

There is an unchangeable physical order; and, with the object of explaining in accordance with this order the observed connections which exist between the masses of matter scattered throughout the universe, and particularly of explaining the forms and relations which obtain among the members of the solar system, several hypotheses have been constructed

which attempt to sketch the main outlines of the evolution of the states of matter.

That which has been longest current is known as the nebular hypothesis of the solar system. This starts with the conception that the solar system was originally a ball of nebulous matter of great tenuity, extending beyond the path of the most distant planet, and possessing a slow movement of rotation. In this nebula, with the gravitation of its particles, a process of condensation began; and its rotatory motion thereupon increasing, it became flattened out into its present disc-like form. The condensation still continuing, the rotatory motion continued to increase; and at length, the tangential motion of the equatorial regions increasing so as to prevail over the central gravitative force, masses of matter became separated at the circumference. These detached masses, condensing in turn, gave rise to the planets; and, where matter was again detached, to the secondaries of the planets. Such is in brief outline the nebular hypothesis. But this hypothesis, though it explains many of the characteristic features of the solar system, is not without its difficulties. It probably, however, embodies a true cause of stellar evolution; and, in particular, it appears to be peculiarly appropriate to the explanation of what is observed to take place in the evolution of the planetary system in the nebula of Andromeda.<sup>1</sup>

The difficulties of applying the nebular hypothesis with exactitude to the circumstances of the solar system, have given rise to various other hypotheses; but of these it will be sufficient if we call attention to the meteoric hypothesis of M. Faye, which, we may remark by the way, is also not without its difficulties. M. Faye, starting from a wider view of the universe than the solar system, builds his view of the evolution of the states of matter upon the analogy of the nebulae now existing in the heavens. He considers the universe to have been evolved not from a nebulous matter, but from meteorites "widely scattered in chaotic

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<sup>1</sup> See Dr. Huggins' Paper, read before the Royal Society, May 2nd, 1889. Abstract in *Nature*, vol. xl. p. 431.

disorder." Among these meteorites currents were generated under the action of mutual gravitation. Shreds of matter became detached. And these, proceeding to agglomerate and evolve under diverse circumstances, have given rise to the various orders of celestial phenomena. The solar system he considers to have had originally a spheroidal shape, and to have been made up for the most part of separate meteorites, the whole possessing a slow movement of rotation. The meteoric matter was at first pretty evenly distributed throughout its volume; but those meteorites whose orbits were highly elliptical, and which therefore crossed the orbits of many others, had less chance of escaping collisions; and by collisions a central nucleus was originated. Around the nucleus, rings or bands of matter then began to form, those nearer to the nucleus attaining a definite shape earlier than those more remote. And these rings in process of time breaking up, either internally or externally to the general mass, became aggregated into spheroidal bodies, which in turn were subjected to a like process of evolution. The planets formed from rings which broke up internally, were endowed with a direction of rotation the same as that of the rings; and those which broke up externally, that is after the sun had become formed "by the reunion of all the matter not wanted for the rings," revolved on their axes in the opposite direction. Thus all the planets from Mercury to Saturn were formed before the sun had attained a preponderating mass; and the planets outside of these were in all probability formed afterwards.

In addition to these hypotheses we must also direct attention to the more general hypothesis of Mr. Norman Lockyer. Reasoning upon the character of the spectra, which are obtained from various nebulae and stars, Mr. Lockyer asks us to recognise the fact that between nebulae, comets, and stars there exists no physical difference whatever. The universe, he tells us, has not been evolved from an extended mass of vapour into systems of suns with attendant planets, but nebulae, suns, and planets are all only different states of aggregation of meteoric masses, admitting possibly of such an evolution as that

sketched by M. Faye, and not necessarily<sup>1</sup> at variance with the nebular hypothesis. We are told to look back upon a universe of stones, with the collisions of which the evolution of the worlds was set in progress. Certain classes of nebulae present to us a comparatively primitive order of things, in which the stones are separated from each other by wide intervals, so that on collision the vapours which arise are of extreme tenuity, and give no luminous spectrum. Another class of nebulae and some stars present a further development, in which the distance between the meteorites is less, and the tenuity of the vapours after collisions is not so great; these nebulae and stars yield, in their spectra, bright lines or flutings. The next stage is when the distance between the meteoric masses is comparatively small, and we have the meteorites, after collisions, remaining enveloped in their own vapour, which is incandescent, and indicates its presence by absorbing the light of the red-hot or white-hot meteorites themselves. The final stage is when the meteorites, under the influence of the heat evolved by the collisions, assume the form of meteoric vapour, which, condensing and parting with heat, becomes in time, through a gradation of changes, a consolidated mass, possessing a crust like the earth on which we live. New stars may be produced by the clash of meteoric swarms; and such clashings may even form an integral part of the economy of Nature; but in recorded time there has been no such thing as "a world on fire," or the collision of masses of matter as large as the earth.

Such is the cosmogony Mr. Lockyer develops from the revelations of the spectroscope. And in connection with it he gives an interesting curve of the temperature of the heavenly bodies, rising from the low temperature of an extended swarm of meteorites to the highest temperature of a vaporised mass, and sinking again to the low temperature of a crust-bound consolidated body. The nebulae, in which the interspace

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<sup>1</sup> See abstract of paper read by Professor G. H. Darwin before the Royal Society, November 15th, 1888, in *Nature*, vol. xxxix. p. 81, where it is suggested "that the fluid pressure essential to the nebular hypothesis is, in fact, the resultant of countless impacts of meteorites."



between the individual meteorites is large, possess a low temperature, roughly corresponding to that of the consolidated mass of the earth. As the interspace becomes less the temperature rises until, when a state of complete vaporization supervenes, we have stars of the highest temperature. Then, as the vapours condense the temperature becomes less, and we arrive at stars, like our sun, which are gradually cooling. At a greater condensation a crust forms, and the temperature continues to diminish until we arrive again at a low temperature, in the case of bodies with consolidated crusts.

These are the more probable of the current hypotheses of the evolution of the states of matter; and each of them, however speculative its nature, proceeds upon the basis of observed facts, and endeavours to remain true to the principles which are observed to prevail in the present constitution of things. None of them read any speculative conditions into the evolution of the worlds; and none omit any condition which is known to prevail (except that of tidal friction, which, however, affects only the details of the evolution). And, though we may not feel altogether satisfied that any of them are closely accordant to the actual course of evolution, we know enough to be assured that the systems of worlds must have been evolved from an originally extended matter, in some manner analogous to the order which they set forth.

### § 3. *The Constitution of Matter.*

We thus, by the consideration of the evolution of its states, come into view of an originally extended matter. And we have now to enquire further into the constitution of this matter, and the nature of the conditions under which its constitution has been acquired.

The root properties of matter we have stated to be its gravitative, molecular, chemical, and electrical effects; and this statement, though somewhat loose, fairly sets forth the main divisions into which the constitutional properties of matter may be divided.

All definite masses of matter are made up of very small units, called molecules; and, infinitesimally small as these



molecules are, it is to the definite relations which prevail between them, and the definite constitution which they possess, that all the changes in the physical universe are to be ascribed.

The molecules of all substances are subject to a law of attraction, known as cohesion, and also possess proper motions, which we recognise as heat either latent in the form of molecular motion or evident in the temperature of bodies. The solid state of matter results from the attractive force binding the molecules, which still preserve their proper motions, into a more or less rigid association; the liquid state ensues when the attractive force is diminished by the greater amplitude of the molecular motion, and the molecules are able to glide freely amongst each other; and the gaseous state prevails when the molecules, though continually encountering each other, have each a free path, which is sensibly rectilinear. And if we rarify a gas until the free path is large and the number of encounters small, we produce a state of matter possessing peculiar properties of its own;<sup>1</sup> also if, as is practically impossible, we could reduce a solid to the absolute zero of temperature the inter-molecular motion would cease, and we should have a state of matter to which a solid would bear as little analogy as it does to a liquid. In either case, however, matter, as we commonly know it, would cease to exist.<sup>2</sup>

We only know of matter through the mutual relations of its constituent molecules, and our conceptions of the states of matter are strictly conceptions of aggregates of related and not individual molecules. These related molecules, however, we find to be composed, each in general, of a variety of substances, and to be subject under particular circumstances to constitutional changes. Constitutionally considered, molecules are themselves combinations of still smaller bodies, called atoms, which are probably separated from each other in the molecules by

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<sup>1</sup> See Mr. W. CROOKES' "Contributions to Molecular Physics in High Vacua." *Philosophical Transactions of the Royal Society*, part ii. 1879. And abstract in *Nature*, vol. xxii. pp. 101 and 125.

<sup>2</sup> See a paper by Mr. W. CROOKES, "A Fourth State of Matter," *Nature*, vol. xxii. p. 153.

distances great in comparison with their sizes. And upon the definite relations, one with another, of these atoms all the constitutional changes in matter depend.

The molecule is reducible to the atom. And existing in a few definite forms, known as the chemical elements, the atom is, in all atomic matter, the ultimate and irreducible unit. The application of heat to a body, composed of molecules in which are represented more than one chemical element, by increasing the amplitude of the vibration of the molecules, causes, at an intensity of temperature varying with different substances, the dissociation of the molecule; and it is probable that the enormous temperature of certain regions of the sun has a dissociating power which reduces even the elements themselves from a molecular to an atomic condition. No available amount of heat, however, nor the action of any other physical agent, is able to make any change in the atom; and matter, as it exists in the present order of things, has for one of its conditions the indestructibility of the atom. The molecule can be dissociated, but the atom resists all efforts to dissociate it; and the sphere of constitutional change is limited to the production of new molecules by the re-arrangement under favourable conditions of the atoms of former ones.

About seventy kinds of these elementary atoms are known to exist; and though under gravitation all substances fall with the same speed, yet in every respect the properties of the atom vary with each substance.

In relation to mechanical motion, each atom has its own definite capacity for receiving and imparting motion, which we express by means of its atomic weight; and a very important law, established by Mendeléeff and others, is that the chemical properties of the various atoms are functions of their atomic weights.

In the chemical changes of matter, when an exchange of atoms occurs between molecules, or, as it is usually expressed, when substances re-act, the action that takes place, though modifiable by certain conditions, such as temperature, and the relative masses of the re-acting bodies, is found to depend

upon a definite affinity resident in each element. And, in the generally received hypothesis of the formation of chemical compounds, the chemical affinities of each element are supposed to be related to a number of bonds or poles, which exist in the element, and by means of which it becomes united to other elements. Another view, however, which extends the sphere of chemical activity so as to include the phenomena of solution, rejects the hypothesis of these bonds, and regards chemical re-actions as depending simply upon the character of the atom.<sup>1</sup>

But the theory of bonds is in many ways illustrative of the character of the atom; and is used, moreover, with great force to manifest the connection between chemical re-actions and electricity. Faraday expressed himself to the effect that the forces termed chemical affinity and electricity are one and the same; and Helmholtz, in the Faraday Lecture of 1881, advanced the hypothesis that the phenomena of electrolysis show that each of the elementary atoms is united to a definite quantity of electricity, varying in proportion to the number of bonds in the atom.

The nature of electricity is still a matter of hypothesis; but though it is related essentially to certain states of the matter of space, we have abundance of experimental data to demonstrate that the manifestations of it are all connected with atomic matter; and that, so far as it is an agent of change in the universe, it is so as associated with the molecular constitution of matter. Electricity presents itself in three forms, electrical discharges, currents of electricity, and magnetism. And that electrical discharge implies a molecular disturbance, is shown by the facts that no discharge takes place through a perfect vacuum, and that the discharge in air, or in other gases, under various pressures, is a function of the molecules filling the space through which the discharge occurs. Next in currents of electricity we observe that "the conducting power of all bodies is affected by heat, and some even, like selenium, by

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<sup>1</sup> See a paper by W. DURHAM, "Chemical Affinity, and Solution." *Nature*, vol. xxxiii. p. 615.

light," and "as we know that in the case of heat and light conduction is molecular vibration, we reasonably conclude that it is the same with electricity";<sup>1</sup> and in confirmation of this, we have the fact that a conducting wire is heated by the passage of a current; and also the researches of M. Planté show "that fine wires conveying powerful currents are wrinkled up into well-defined regular nodes, that these effects are accompanied by a peculiar crackling, and that the wire itself becomes brittle, giving clear indication of the vibratory motion of the molecules."<sup>2</sup> Lastly, in magnetic phenomena, which are observed to occur in the substances iron nickel and cobalt, and which Faraday found to be manifested in all substances, if the magnetic field be of sufficient strength, Professor Hughes has demonstrated that the magnetism is an inherent quality of the molecules, every molecule being a little magnet, and having a certain polarity constant in each substance, but varying with different substances. "Evident magnetism," he says, "is the symmetrical arrangement of polarized molecules in one line; and neutrality is the symmetrical arrangement of the same molecules in closed curves."

And here we may mention a peculiar property of magnetism, observed by Professor Hughes, viz.—

"That not only can the molecule be rotated through any degree of arc to its maximum or saturation [in magnetic condition], but that, whilst it requires a comparatively strong force to overcome its rigidity, or resistance to motion, it has a small field of its own through which it can move with excessive freedom, trembling, vibrating, or rotating, through a small degree, with infinite less force than would be required to rotate it permanently on either side."<sup>3</sup>

And he states that if we assume

"A molecule is surrounded by continuous ether, more of the nature of a jelly than that of a gas, in such a medium a molecule might freely vibrate through small arcs, but a rotation extending beyond its critical limit [of free rotation] would involve a much greater expenditure of force."

<sup>1</sup> See W. H. PREECE, in *Nature*, vol. xxi. p. 336.

<sup>2</sup> *Ibid.*      <sup>3</sup> See *Nature*, vol. xxviii. p. 186.

That some medium pervades all space is certain. There is conclusive evidence that the atoms of matter, whether we regard them as centres of force, or as vortex rings, have definite relations to the portion of the medium which surrounds them; and light, the remaining constitutional property of matter which we have to show to be connected with molecular forces, demands for its propagation a substance which possesses inertia and rigidity.

Light, or, more correctly, radiant energy, consists of transverse vibrations in the matter of space, possessing a high degree of velocity of transmission, and differing in periods of vibration as is manifested in the different colours of light in the prismatic bands of the solar spectrum. In violet light each individual particle of the transmitting medium vibrates to and fro nearly eight hundred million million times a second; and in red light, four hundred and fifty million million times; and dark rays of considerably greater and lesser number of vibrations a second give evidence of their existence beyond the violet and red rays respectively, those at the red, or least refrangible end, being known as the heat rays. The medium, however, acts merely as the transmitter of these vibrations; and, though there are difficulties connected with the velocity of propagation and the phenomena known as the polarization of light, this much is certain, that light and radiant heat originate in the vibration of molecules. The molecules of matter we know to be in ceaseless agitation and continually encountering each other; and all shiverings of molecules after encounters give rise to vibrations in the matter of space which manifest themselves as heat rays if the body, in which the molecules are, be at a lower temperature than that which produces incandescence, and as light rays if the body be incandescent. Also, the difference in period of vibration is intimately connected with the constitution of the vibrating molecule. In incandescent bodies each wave length, or rate of vibration, of light is set in motion by a corresponding period of vibration in the molecules; and the molecules of each elementary substance have their own definite rate or rates of vibration.



#### § 4. *The Evolution of the Constitution of Matter.*

These facts illustrate the constitutional properties of matter; and it now becomes our duty to consider in what respects we can suppose these properties to be phenomena of evolution. The main problem which presents itself, is to give an account of the manner in which the various elementary substances have acquired their distinctive features. The number of these elements, and their apparently arbitrary distinction from each other, have always been sources of perplexity to the mind; and there has long been an unwearied search for the law of connection which would manifest them to be varying expressions of an embracing law. That such a law exists is undoubted. And evidences of it have been sought for in the arrangement of the lines in the spectrum, and in various other directions. But the most suggestive attempt to indicate it is that made by Mr. William Crookes, in an hypothesis based upon Mendeléeff's "Periodic Law," and supported by evidence derived from the properties of the rare element yttrium.<sup>1</sup>

Mr. Crookes, after some remarks upon the relations to each other of the elements, and the various views held with regard to them, proceeds to sketch the probable order of their evolution, first calling attention to a method of illustrating the Periodic Law proposed by Professor Emerson Reynolds.

"Professor Reynolds points out that in each period the general properties of the elements vary from one to another with approximate regularity until we reach the seventh member, which is in more or less striking contrast with the first element of the same period, as well as with the first of the next. Thus chlorine, the seventh member of Mendeléeff's third period, contrasts both with sodium, the first member of the same series, and with potassium, the first member of the next series, whilst on the other hand, sodium and potassium are closely analogous. The six elements whose atomic weights intervene between sodium and potassium vary in properties, step by step, until chlorine, the contrast to sodium is reached. But from chlorine to potassium, the analogue of sodium, there is a change in properties *per*

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<sup>1</sup> See Address delivered by him as President of the Section of Chemical Science, at the British Association Meeting of 1886.



*saltum*. Further, such alternations of gradual and abrupt transitions are observed as the atomic weights increase."

In the second and third periods, forming with hydrogen in the first period the typical elements in Mendeléef's series, there are seven elements, and the fourth, or middle element in each period possesses properties which mark a point of mean variation within the period; the three which precede it in lower atomic weight are distinctly electro-positive in character, and the three which succeed it are as distinctly electro-negative, the difference becoming less strongly marked in the different series as the atomic weights increase. Moreover, the elements above and below the middle element of any series fall into pairs which, though in some respects analogous, are more or less in direct chemical contrast.

These are the facts to be gathered up into the law of evolution; and Mr. Crookes postulates a primal stage of the universe when matter was in an "ultra-gaseous state, at a temperature inconceivably hotter—if such a term could be applied to such a state—than anything now existing in the visible universe." In this state, some process akin to cooling led to the formation of atoms endowed with energy. The substance most nearly allied to the original matter was first formed; then the next, and so on, the lapse of time between each birth of an element being the index to determine its different properties, depending upon the then state of the original matter, and following an order of increasing atomic weight. Two forces operated in the evolution of the elements: one, temperature "slowly sinking through an unknown number of degrees, from the dissociation point of the first-formed element down to the dissociation point" of the last; the other, a swing of what we recognise with regard to atomic matter as electrical conditions "conferring atomicity of one, two, three or four degrees," as it diverged from a neutral line; and a double atomicity of three and five, two and six, one and seven, as it returned; then crossing the neutral line, and conferring atomicities in the same order until it again returned, and the

complete swing was made; all the elements born during the swing being electro-positive in character, as the swing was from the neutral line, and electro-negative as towards it. Helium and hydrogen were first formed. Then, with the swing on the electro-positive side, lithium, glucium, boron, and carbon were formed in order. After carbon, the electro-negative part of the swing commenced, and there succeeded each other, nitrogen, oxygen, and fluorine. The swing then passing the neutral line, and becoming electro-positive, sodium, magnesium, aluminium, and silicon followed each other. And the first complete oscillation was ended with the birth of the electro-negative elements—phosphorus, sulphur, and chlorine. The electrical conditions were then the same as at the beginning; and had the temperature been the same there would have been a repetition of the elements in the same cycle of recurrence; but the temperature had sunk, and so not lithium, but potassium, the element next allied to it, came into existence. With potassium, a new cycle, producing elements closely allied in properties to the corresponding elements in the first cycle, then began, and ended with bromine. And a third, fourth, fifth, and part of a sixth followed, before the temperature had declined to that degree at which no new elements were originated, and the formation of compounds began.

Such is in outline Mr. Crookes' speculation. And in connection with it we may mention the views propounded by Dr. Carnelley, who, pursuing another line of investigation, concludes that "the elements are analogous to the hydro-carbon radicals in both form and function," (Report in *Nature*, vol. xxxii. p. 539), and is led to the inference that the elements are built up of three primary elements—one, carbon, of atomic weight 12; the second conjecturally ether of negative atomicity  $-2$ ; and the third hydrogen. He further observes that "whereas the hydro-carbons are compounds of carbon and hydrogen, the chemical elements would be compounds of carbon with ether, the two sets of bodies being generated in an exactly analogous manner from their respective elements." And, noticing the fact that the hydro-carbon radicals are found

in the heads of comets, it is not inconceivable that something akin to this analogy is expressive of the true order of evolution, and that in the evolution of the hydro-carbons we have the continued action of the same conditions as those under which the elements themselves have been originated.

§ 5. *The Conditions of the Physical Evolution.*

We have now considered the processes of the physical evolution, and are prepared to take account of the constant conditions on which they depend. The evolution of the states of matter reveals to us the aggregation into worlds of an originally extended matter, which possessed the full endowment of the root-properties of the elementary atoms, and the enquiry into these atoms, we have just seen, carries us back to a primary and universal form of matter from which, under the action of certain forces, atomic matter is itself derived.

We are thus led to a conception of the primary organisation of the universe, and into view of conditions approximating to the "undifferentiated homogeneity in unstable equilibrium" postulated by Herbert Spencer as prevailing at the commencement of every series of products of evolution. But before we can permit ourselves to express our conception of the original organisation of the universe in Spencer's terminology, we must carefully consider what is therein implied. Mr. Crookes, in predicating a high temperature for the original matter of the universe, warns us that the expression is only used analogically, temperature being only known in relation to atomic matter; and we must not, except by way of analogy, read terms and expressions, applicable only to what is observed to occur in the process of evolution, into the state of things which precedes the evolution.

In the evolution of the physical universe we seek to elucidate two things, the original state of the matter evolved, and the conditions of its evolution. The first of these Spencer refers to an undifferentiated homogeneity; into the second he reads a condition of unstable equilibrium. And this terminology, properly understood, is not in itself objectionable. For though we have no knowledge of equilibrium, either stable

or unstable, apart from our experience of things which change, unstable equilibrium, as distinguished from stable, has as a characteristic that the potential energy of the system in equilibrium is the greatest possible consistent with equilibrium; and, as connoting this, the term may not inaptly be applied, by way of analogy, to the primary state of the universe, when all the energy it contains may be supposed to have been potential. But if the term unstable equilibrium be taken in any other than its strictly physical sense, and applied to the primary state of the physical universe in the loose way in which Spencer applies it when he asserts that the "condition of homogeneity is a condition of unstable equilibrium," exception must certainly be taken to it. For it is then used, not as analogically descriptive of underlying conditions, but as defining a necessarily antecedent and ultimate condition of change; and though the predication of it in this sense, as preceding change, enables us very adroitly to avoid the confession of our inability to account for the origin of change, we must not disguise from ourselves that in so predicating it we only succeed in veiling our ignorance.

If Mr. Crookes' speculation be well founded, temperature and electrical conditions lie at the base of all the distinctive properties and relations of atoms and molecules; and even if it be not well-founded, the facts on which it is based indisputably point to the truth that the differences in the properties of bodies, and in the root-properties of matter itself, stand in definite relation to the forces and energies of the universe. In fact, what we call the constitutional properties of matter are simply the ways in which we view the medium, in its various modes of affection, through which are manifested the physical forces and energies. Our conceptions of the molecule and the atom, and of their relativity to a matter permeating space, are merely the forms under which we conceive the manifestations of force and energy; and the various properties which we regard the atom and molecule as possessing, are all inferred from the peculiarities of their behaviour under the action of the various forces and energies. Atomic matter is matter which is subject to the force of gravitation; the mutual

relations between molecules are the forms in which we view the energy of absorbed heat and the force of cohesion; inertia and the atomic weights of the atoms are expressions of the varying effects of the energy of mechanical motion; the changes that take place between the atoms constituting molecules are manifestations of the force we call chemical affinity; and our conceptions of the electrical properties of bodies and of light, which is probably a form of electricity, are altogether derived from the behaviour of electricity and light in connection with molecular disturbances. We may therefore, in seeking for the conditions of the evolution of the constitutional properties of matter, substitute for these properties the various manifestations of force and energy. And it follows that if we can arrive at the constants which obtain in the relations to each other of the forces and energies of the universe, we shall have determined the constants which obtain in matter, and may, without hesitation, take these as embodying the conditions of its evolution.

The conditions of the physical evolution are represented in the conditions of the manifestation of force and energy. But the forces of the universe are only known in relation to the changes of the universe; and force itself is merely a name for the rate at which energy does work. Thus, masses of matter change their relative positions with regard to each other, or as we term it, manifest an attraction for each other resulting in mechanical motion, and this change we describe as the result of a gravitative force between the masses; also re-actions take place between the atoms of different substances, and these we ascribe to a force of chemical affinity; and generally we conveniently ascribe the changes that take place in the universe to causes which we call the forces of the universe.

Force, however, as we have said, is merely a name for the rate at which energy does work. The physical forces, enumerating only those which are primary in character, are gravitation, cohesion, chemical affinity, and the forces manifested in electricity and light; and these are all rates of change in corresponding modes of energy. Every gravitative effect is a measurable change in the mode of energy of mechanical



motion; the force of cohesion in each substance increases in the exact measure to which it is deprived of the energy of molecular motion, or absorbed heat; chemical affinity is only manifested to the degree in which the energy of chemical separation passes into some other form of energy, such as that of heat or electricity; and the forces manifested in electricity and light are nothing more than measures of the rates at which work is done with reference to atomic matter by the energies present in electricity and light. In fact, the manifestations of force are simply re-distributions of the energy of the universe. And in relation to these re-distributions, when any force is operative in actual changes the energy is said to be active, and when the forces are balanced, so that no changes ensue, the corresponding energies, though potentially present, are said to be latent, that is quiescent in a particular configuration of phenomena, such as the holding apart from each other of masses of matter by the influence of other masses, or the separation from each other of atoms that tend to unite and form a compound.

And corresponding to these active and latent states, each mode of energy is regarded as possessing the forms of an energy of motion and an energy of position, an exception being made in the case of the energy related to the force of chemical affinity, which is regarded as an energy of position only, due to the separation of atoms which have chemical attraction for each other. Heat may be evident in the form of temperature, or absorbed in the latent form of molecular motion, as is seen in using it to convert water into steam, where the heat disappears in overcoming the force of cohesion, but remains stored up in the freer motion of the molecules, and reappears again when the vapour cools. The active energy of mechanical motion has a corresponding energy of position, as is illustrated by dropping a heavy body from a height on another body, the momentum with which it strikes the other body being derived from the energy of position it has when at the height from which it falls. Electrical energy appears as an energy of motion in electrical currents, and as an energy of position when subject to stress or strain in bodies charged with



opposite positive and negative electricity. And light, or radiant energy, consisting of vibrations, is alternately energy of motion and energy of position.

We further observe that in the order of change changes are correlated, so that energy of one mode can, under appropriate conditions, be converted into energy of another mode. Nature is full of such conversions. The steam-engine illustrates the conversion of heat into mechanical motion, and the thermopile its conversion into an electrical current; the heat applied to separate a chemical combination passes into the energy of chemical separation; and if a crystal of tourmaline be heated it manifests electrical energy of position; finally, if a hot body cools in an open space, heat passes off in the form of radiant energy. And similar transformations take place with regard to the other modes of energy. The energy of mechanical motion is by means of friction converted into heat, or by means of an electrical machine or the presence of an electric current into the forms of electrical energy. Chemical separation passes into the form of heat when bodies are burned, and the oxidation of the zinc in the voltaic battery gives rise to a powerful electric current. When two oppositely electrified bodies approach each other we have the conversion of electrical separation into mechanical motion; and if a spark pass between them we have its conversion first into a current of electricity, and ultimately into radiant energy; also if a current of electricity pass along a badly-conducting substance it is converted into heat, and when it is applied to decompose a substance such as water it changes into the mode of chemical separation. Finally, when radiant energy falls upon an opaque body it is changed into heat, and when certain rays, passing into the camera-obscura of the photographer, decompose the chloride of silver, it passes into the form of chemical separation.

And in all these and other transformations of energy we mark the condition that no energy is lost. Whatever disappears in one mode reappears in another, and the change from one mode to another is always in the same quantitative relation, no matter how diverse the chain of intermediate changes may have been. The radiant energy expended by the

sun in evaporating the waters of the ocean, is stored up in the clouds, and returned in various forms, in the liberation of heat by the fall of rain, in the heads of water in our lakes, and in the running streams that turn our water wheels; and could we follow the transformation through all its forms, the same amount of energy would be found to be restored again as had originally been expended. In the case of the transformation of mechanical motion into heat, the exact relation between the motion expended and heat produced has been accurately determined to be 424 units of work as necessary to raise by  $1^{\circ}$  C. the temperature of one kilogramme of water; and we are well assured, from the observation of other exchanges of energy, that similar quantitative relations exist in every transformation from one mode to another.

The physical universe is thus a network of organizations through which the energies of the universe are manifested, and in which certain changes occur in the re-distribution of energy. Its changes are changes of energy from one form or mode to another; and in the changes that take place no energy is lost. The energy of the universe is, therefore, a constant quantity. And the principle of the unchangeable order of the physical universe, not unsupported by the evidence of the past, enables us to proceed further, and to infer that it has always been a constant quantity. The past and the present are bound together; and the fact of the conservation of energy assures us that a change in the past leads to a configuration in the present which retains or passes on the energy re-distributed in the change. The light that comes to the earth from a distant star awakes a molecular change on the earth, corresponding to the change effected when the light left the star. Also in the far past of the Carboniferous ages, the radiant energy of the sun fell upon the vegetation of the earth, and by means of the actinic rays, enabled the plants, through their chlorophyll cells, to dissociate the carbon from the oxygen in the carbonic acid of the air. Energy of motion was thus spent in the production of the energy of position resident in chemical separation, to be restored again in our own day in the energy of the heat which drives our machinery and warms our rooms.

We hence infer that in the physical universe the energy of the universe has neither been added to nor diminished; and we may fairly conclude that the universe manifests an order and arrangement in which from the very first energy has been conserved; and that this factor, present in its primary organization, has been present in all the changes it has undergone, and has co-ordinated them into an orderly system of evolution.

### § 6. *The Law of the Physical Evolution.*

From the moment that atomic matter became existent, it has always manifested the properties of molecular motion, gravitative tendency, and electrical charge; and in the process of evolution, the changes which have occurred in atomic matter have always taken place under the condition that the sum of the energy resident in these properties has remained constant. So far as our gaze into the past travels along the solid ground of Nature, we observe the law of the conservation of energy; and, even when we ascend into the cloudland of speculation, though we carry with us the notion of the uniformity of Nature, we still trace among the independent speculations the same law of conservation. Mr. Lockyer's hypothesis, for instance, demands the conception of an originally low temperature in the extended meteoric masses; and noting that the chemical evolution conjectured by Mr. Crookes must have taken place prior to the formation of meteoric swarms, we may conceive that when the temperature had sunk to the point when the formation of compounds began, we had a universe of meteorites widely distributed and at a comparatively low temperature. Then when stars were formed by the gravitation of the meteoric swarms, and there was reproduced in the state of vaporization the disunion of the aggregating masses, and probably the dissociation of the molecular state, we had, as the law of the conservation of energy would lead us to expect, the reproduction of an originally high degree of temperature.

There is nothing to warrant us in taking energy to be a product of evolution. Evolution began when change began; but every change is a change in the form or mode of an un-

changing energy; and to conceive for a moment that energy is a product of evolution, we should have to inflict on our understanding the fantastic imagination that the first change in the mode of energy was the creation of energy. The energy of the universe—and also the matter of the universe—has been transformed into a number of associated forms, and not created by the process of evolution. Evolution tells us the story of change; but behind change lie the unchanging constants of the universe, matter and energy—if, indeed, these be two, and not merely the two different conceptions we are constrained to take of what is really one and the same thing. Under these unchanging constants the evolution of the physical universe runs its course; and from the single primary organization which contained them, there has been gradually formed, under the law of conservation, a more and more complex order of subordinate and interdependent organizations, of which the present aspect of the universe is the existing phase.

And further reflecting that the primary organization is the original storehouse of the energy, and that the energy is conserved under every phase of the universe, we arrive at the conception that each successive phase of the universe has preserved intact, under the multitude of secondary and subordinate organizations, the primary organization of the universe. And we conclude this preservation to be the law of its evolution.

### § 7. *The Question of the Origin of the Physical Universe.*

We are now prepared to interpret the significance of the physical order of evolution. But before we do so, we shall give a passing notice of the question of the origin of its organization—more, however, with the object of disposing of certain questions than with the hope of attaining definite results.

There are current three views of the origin of the universe—the creationist, atheistic, and agnostic views—each of which for the most part endeavours to establish itself on the basis of a destructive criticism of the others, and all of which waste

powder and shot against imaginary foes. The creationist advances with antiquated artillery, and keeps up a noisy cannonade against the atheist, who in turn deserts his position and flees for shelter to the camp of agnosticism; and the agnostic, roused from slumber at the din of battle, pours forth a furious fusillade that does little more than riddle to rags the banners of atheism.

The supporters of the view that makes for creationism conceive the opposed views to be founded upon the supposition that the cosmos began by a kind of happy chance. They ask, "Did the atoms take counsel together and devise a common plan and work it out?" (FLINT'S *Theism*, p. 107.) And they imagine that if, in any way, they demonstrate that chance is not an element in the organization of the universe, they have made out a claim for the acceptance of their views. For instance, it is triumphantly claimed, on the authority of Professor de Morgan, that the odds are twenty thousand millions to one against chance being the cause of the eleven planets—all that were known at the time—moving in one direction around the sun,<sup>1</sup> and that therefore intelligence alone can account for the occurrence.

But from the point of view of evolution we can take no account of the possible operation of chance in the origin of the universe. We may if we please indulge in the fancy that the phenomena which exist in the universe are the particular occurrences which have occurred out of an infinite number of possible occurrences; but the fancy has no basis in the evolution view of things. In the evolutionary view it is not the occurrences, or more strictly the relations of matter, which need to be accounted for, but the conditions which give rise to these relations. The relations, for instance, which obtain between the atoms of hydrogen and the atoms of other substances may conceivably be occurrences out of a number of possible occurrences; but if so, the possible occurrences are conditioned by the fact that they are derived from a primary and universal relation, under the operation

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<sup>1</sup> *Theism*, Appendix, p. 372.



of a process of evolution which acts in such a way that the primary relation persists in the derived relations. In discussing the origin of things it is the primary organization of the universe, not the interdependent relations derived from it, on which the attention must be fixed. And all speculation that it may be due to chance is beside the mark. We can only speak of chance as applying to an individual occurrence, or some selected occurrences, in relation to a number of possible occurrences; and as such, it cannot be applied to the original organization of the universe, which, unchanging and persistent under every change, places a bar against the conception of any other occurrence than itself.

We take it as axiomatic that the primary organization cannot be looked upon as an occurrence out of a number of possible occurrences; but it is possible that the secondary and interdependent organizations may be so viewed. Evolution began with a matter possessing an energy capable of changing its form, but admitting neither of increase nor of diminution. It progressed along a certain course, and effects became multiplied. The chemical atoms were born, one by one, and the worlds began to be formed, every change being conditioned by the properties of the formed matter and the conservation of the energy resident in it. There would therefore be, conceivably, many possible combinations which might obtain; and the one or more of these which did obtain might be looked upon as an occurrence, or occurrences, out of a number of possible occurrences. We cannot say, however, assuming the case to be so, that such were chance occurrences other than relatively to the particular conditions under which they arose. With chance, undetermined by conditions,<sup>1</sup> if such chance can possibly exist, evolution has nothing to do. And probably chance, in the accurate sense of the term, is equally inadmissible in the actual order of things. The scale on which the operations of Nature are carried on is so vast and so varied in degree, that it may not unreasonably be

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<sup>1</sup> There are people who speak of chance in such a way as to lead one to think that they imagine it possible for a penny to be thrown up and to come down neither head nor tail.



assumed that every combination of occurrences possible at a given time has been realized; and that what has occurred, has occurred because the conditions of occurrence were such that these and no other could occur.

We limit, then, the chance element in evolution to a possible, but not very probable, action in the rise of particular interdependent relations. But this does not authorize us to say, with regard to the ultimate constituents of matter, that we can "conceive no origin for them but creation."<sup>1</sup> We can conceive that molecular matter has become what it is through a process of evolution from a primary organization; but to what this organization itself is due, must, so far as cogitation upon it unaided by other inferences is concerned, ever remain wrapt in impenetrable mystery. And certainly we cannot ascribe it to creation, unless we demonstrate that the relationship of God to the universe is such that we must conceive Him to have created the universe and impressed upon it the organization it possesses. No view of creationism which directs its attention to merely destructive criticism, or which relies altogether on negative arguments, can be placed on a rational basis.

We are not really driven, however, to the conclusion that the organization of the universe presents to us an impenetrable mystery. As a naked problem, the question of its origin is insoluble. But taken as it ought to be in connection with other ultimate facts of the order of evolution, the organization of the universe presents to the mind of the philosopher a problem of the greatest interest, that may one day find a full solution; and it will be seen that the object of this treatise is to show that, viewed in relation to the general order of evolution, it is not incapable of solution from the interpretative point of view, as belonging to a system manifesting purpose. Even those who adopt the agnostic attitude with regard to it, cannot avoid philosophizing upon it, and otherwise interpreting it in a positive manner. Philosophically, they feel bound to recognise the distinction between mind and matter; and, placing alongside of each other the

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<sup>1</sup> Rev. J. M. WILSON's *Essays and Addresses*. Address on "Water," p. 16.

problem of the mind and that of the universe outside of mind, they are constrained to refer both to an unknowable source. And interpretatively, though they assume the universe to be inexplicable, the very attitude of mind in which they contemplate it forces them to view it in a more or less materialistic manner. And thus they present for acceptance the strange anomaly of a non-materialistic philosophy wedded to a materialistic creed.

### § 8. *The Interpretation of the Physical Order of Evolution.*

Some interpretation of the universe we must have. And we may conclude from the bare fact that there is an evolution, in which interdependent organizations are evolved from a primary and persistent form of organization, that a teleology of some kind must exist. An organization accompanies evolution; and, as the process of the physical evolution in no way undoes this organisation, but in point of fact takes place as a part of it, an organization lies in advance of every stage of its evolution. And not even on the supposition that the present cycle of evolution is one of an unending series of evolutions, do we escape from the conclusion that there is an ultimate organization to which the process of evolution tends.

The physical order of evolution, as we know it, is progressive. Its process consists essentially in the formation of interdependent forms of organization. And wherever disintegration in part takes place, as in the vaporization of a meteoric swarm, it takes place not as an absolute retrogression of the evolution order, but merely as a relative retrogression of the mode of energy in the portions of matter affected.

This will be clear, if careful attention be given to the distinction between the order of the distribution of energy and the operation of the process of evolution. According to the order of the distribution of energy, the mode of energy present in any given portion of matter may run through a cycle of changes, and return to its primary mode; but by the operation of the process of evolution, the universe does not by any change become less differentiated than before,

but more so. In the vaporization of a meteoric swarm, for instance, though the mode of energy reverts to the form of heat, and the molecular structure probably undergoes disintegration, yet the universe is not less, but more, differentiated than before. Several independent masses of matter have become united into one mass; and among the interdependent organizations of the universe a new form has arisen, which is both an advance in the line of physical evolution, and also at the same time, if appropriately situated with regard to other masses of matter, and in other respects suitably conditioned, an approach to the manifestation of the succeeding orders of evolution in respect of the physical conditions necessary thereto.

In the physical universe there are two ultimate facts—the existence of an energy which manifests itself under a variety of forms, but always such that it never suffers diminution, nor admits of increase; and the existence of a matter which, however protean in its forms, is the indestructible basis of this energy. Upon these two facts rests the whole order of the cosmos. Its evolution we assume to begin with a state of unintegrated matter—a state in which atomic matter was non-existent, and in which possibly the ether or matter of space was not as it now is. The atoms were born. The energies of the universe manifested themselves. And from the beginning of evolution the order of things has always been that if the change from one configuration of phenomena to another be gone through in the opposite order, the same amount of energy attendant upon the change is withdrawn as had become manifest, or becomes manifest as had been withdrawn. Upon this law depends the process we know as physical evolution. And this process is that of a continuous formation of more and more complex relations of matter. In the earliest stage of evolution, we conjecture a continuous fall of temperature, and a gradual integration of matter under the swing of electrical conditions, accompanied by the storage of energy in the properties of the chemical atoms. We also suppose an evolution of the worlds in the gravitation to each other of masses of formed matter, giving rise in

time to the present variety of nebulae, suns, planets, comets, and meteorites, bound together by cosmical conditions and the law of gravitation. And, finally, we observe in the present, a continued evolution in which molecular activities are ceaselessly going the round of an orderly system of interchanges, producing the manifold phenomena of the physical world, and forming the basis of further systems of evolution. In all this we mark a progression necessarily resulting from the conditions under which the evolution takes place; and we may not, because of any speculative fancy, refuse to this progression its legitimate significance that the order of evolution points forward to some ultimate stage of organization.

The solar system, indeed, is cooling down; and, when the sun shall have died out, the phenomena of the succeeding orders of evolutions, as we behold them on the earth, will have disappeared. And possibly the physical universe as a whole is moving with extreme slowness to an ultimate stage of equilibration, in which the energies of the universe will be quiescent. It is also conceivable that in the event of this possibility occurring, some differentiating factor may at the ultimate stage start again a new cycle of evolution. But even if all this be so, the significance of the order of evolution, as it at present prevails, is not thereby destroyed. The hypothesis of unending cycles of physical evolution merely throws the interpretation of its organization upon the internal processes which prevail in each cycle, and constrains us to look for the teleology of the universe in the culminating characteristics of the present cycle.

## CHAPTER V.

### THE LAW OF THE PROTOPLASMIC EVOLUTION

#### § 1. *The Root-Properties of Protoplasm.*

PROTOPLASM, the basis of all plant and animal life, possesses peculiar properties of its own which mark it off from the ordinary constitution of matter. A semi-fluid contractile substance, under the microscope we see it traversed by waves, and observe it flow in streams, either broad and truncated, or thread-like and reaching to a considerable distance from their source. Now it spreads itself out into a thin liquid layer, and again it gathers itself together within its original limits, apparently uncontrolled by outside forces, and making sport of gravitation. Under the highest magnifying powers, we find it to consist of a minute network of delicate fibrils embedded in an apparently homogeneous substance. And in its non-nucleated simple state it may be taken to be the lowest of living things, possessing a power of assimilating the materials necessary for nutrition and growth, and growing both by "accretion of particles on the surface," and by an "interstitial appropriation of new matter within its most minute organized particles."<sup>1</sup>

True organization of life into individual form, however, begins with the protoplasmic cell. And in the next higher of living things, of which we may take as an example an *Amœba*, we observe a body which has not only an outer boundary of apparently firmer protoplasm, but also a distinct nucleus, or small globular mass, embedded in it near the centre. The whole lump forms a cell and is really a living unit, manifesting all

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<sup>1</sup> SIR WM. TURNER. *Nature*, vol. xliii. p. 34.

the essential attributes of life—movement, assimilation, and reproduction. If we watch the *Amœba* as it lies in a drop of water under the microscope, we shall see a broad stream of protoplasm run from its body, envelop and carry back something in the same drop that has given to it the special stimulus necessary to awake its prehensile power. This something then sinks into the protoplasmic mass and becomes dissolved, digested, and assimilated as food, to increase the size and restore the energy of the *Amœba*. Again, we shall observe that on attaining a certain size, the nucleus embedded in it divides into two halves; and, the surrounding protoplasm becoming also divided, two new *Amœbæ*, each retaining one half of the original nucleus, arise and take up the functions each of a complete life.

Such is the simple cell, or lowest of known living units. Cells, however, not only exist as independent units, but also as associated cells they combine to form the tissues and other parts of every form of life, plant and animal. They are the biological units which make up the living body, as the atoms are the physical units which make up the forms of physical substances, and however much the various parts of a living body vary in character they are all composed of more or less modified cells. In fact, every plant and animal organism is made up of colonies of cells, which work together and live modified individual lives, while at the same time they constitute the basis of the life of the organism.

In the lowest organisms, consisting of single cells, the performance of every function of life devolves upon the protoplasm of the single cell; but in the higher organisms, consisting of a society of cells, a division of labour has taken place, and the various functions of life have become allocated to special cells or groups of cells.

In every complex form of life, however, many of the component cells preserve their full individuality. In the human blood, for instance, and also in the blood of every warm-blooded animal, the red corpuscles are modified cells, while the colourless are cells still retaining their original form and properties, being little masses of protoplasm enveloping a nucleus. These



change their shape, project and withdraw their feelers, and creep about like an *Amœba*. They will take solid food as nutriment, and have even been known to devour the smaller red corpuscles.

And the same is true in plants, where, after the earliest stages of life, the protoplasm is confined in strong resisting walls, formed by a secretion from the cells, and called cellulose. Within the cellulose, however, the protoplasm still continues its activity, and is able to re-act on the outer world by means of the permeability of the walls; and in the stinging hairs of the nettle and in other kinds of vegetable hairs, it may be seen sending off into the sap cavity tongues and filaments which form an irregular network that perpetually undergoes changes as granules are drawn in from the cavity. "The vegetable cell, in short, with its surrounding wall of cellulose, is in all essential points a closely imprisoned *Rhizopod*."<sup>1</sup>

In protoplasm we have thus an order of activities altogether different to those we have met with in the physical order of evolution. And however ingeniously we may seek to link on the protoplasmic structure to the physical states of matter, we cannot fail to see in its properties the rise of a new order of phenomena. It may possibly be true that protoplasm is a development in the line of those colloidal bodies which resist diffusion, and which pass under the slightest influence from the fluid to the gelatinous condition; so that, taking a colloid to be composed of a network of molecules, the structure of protoplasm may be regarded as due to the rise of a process of constant change between the connected molecules. And we need not hesitate to say that if an hypothesis can be constructed which is able to account for the origin of protoplasm in accordance with the principle of continuity, such an hypothesis must be regarded as more or less probable. But a physical explanation of the structure of protoplasm would in no way account for the energies of life, or enable us to class the activities of life under the category of such physical processes we have hitherto

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<sup>1</sup> See Address, delivered as President of the British Association Meeting of 1879, by Professor ALLMAN. *Nature*, vol. xx. p. 386.

found to prevail. That molecular forces and physical conditions prevail in life, amounts in itself to nothing more than that these forces and conditions are necessary to the existence of life; and not unless every activity in it be shown to be subject to the ordinary laws of matter, and to come within the domain of the interchanges of energy, can life itself be included under the physical processes of the physical evolution.

And that there is something peculiarly characteristic of life is strikingly manifested on comparing a life-form with a crystal.

At first sight it might appear that a life-form, however seemingly differentiated from a crystal, is yet essentially a phenomenon of the same order. Crystals possess a definite structure, and are subject to laws and modes of action which indicate the possession of a highly complex organization. They respond in determinate ways to the action of various external agents, and possess a number of remarkable planes, called cleavage, gliding, and solution planes, that manifest many peculiar properties. They also possess a definite manner of growth by accretions from without, and, having a stable chemical constitution that does not demand the ceaseless activity of an animal or plant to sustain itself, a crystal may continue to develop its particular form without limit, so long as the necessary conditions of growth are present; and may even, in their absence, if not ruthlessly destroyed, have its power of growth simply suspended, to become active again when the conditions of growth are again present. Moreover, as there is an individuality in each plant or animal, so is there an individuality in each crystal. The perfection of form in a crystal is subject to great variation, and its optical properties are never precisely what they ought to be, according to theory. Also, a particular crystal, which has been formed under particular conditions of time and place, partakes of a character of its own, which can no more be reproduced than a particular life-form, with its appropriate adaptations, and particular accidents of life.\* And arguing from these points of analogy of a

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\* See Lecture by Prof. J. W. JUDD. *Nature*, vol. xxxv. pp. 382 and 415.

crystal to a protoplasmic organism, it might appear that both are resultants of particular forces and conditions, and that neither possesses any inherent powers other than those which are resident in ordinary matter, the apparently peculiar properties of life being only the effect of a peculiar delicacy of organization.

A living body, however, differs in many important respects from a crystal. And a crucial point of difference is, that the crystal of any substance, when broken up into an amorphous mass, can, by a repetition of the process by which it was originated, be restored again, while in the case of a living body this is impossible. The chemist, indeed, can build up from inorganic bases many organic products, and may even, in time, attain to the synthesis of albumen, one of the characteristic elements in protoplasm; but the formation of living matter is universally conceded to be beyond his power. Protoplasm, living and potent of future modifications, is as unique as the chemical elements themselves.

The assimilative property of protoplasm, involving as it does the motion of masses of matter towards the protoplasmic body, and being accompanied by certain chemical re-actions, has undoubtedly a close connection with the system of energy. Indeed, the assimilative function depends upon the supply of energy, and without the presence of heat and moisture cannot take place. Dried infusoria have their vitality suspended until moisture is again present, and without the heat of the hen, or an incubator, the embryo of a fowl is incapable of assimilating the food prepared for it in the egg. And not only is energy thus required to maintain the assimilative function, but the resultants of the process are also strictly in accordance with the law of the conservation of energy. The plant uses the light of the sun to decompose the carbonic acid of the atmosphere, and stores up the energy thus withdrawn in the form of wood; and the animal takes in energy in the food it eats, and re-converts it into energy of motion. But yet, even in the assimilative process, there are elements which are distinctly peculiar to life. Its relations to the system of energy are characteristic, not so much of the assimilative process in itself,

as of the work done by it. The activity of protoplasm in its assimilative aspect consists essentially of two parts, a living agency which is stable, and a non-living molecular stream continually undergoing transformation; and while the latter is subject to the system of energy, the former is as ultimate a cause of change as the physical forces themselves.

The essential difference between the activities of life and the physical forces is, in fact, precisely this, that the physical forces are, on the one hand, agents of a change that takes place simply as a change of organization, in which the only element conserved is the energy present in the matter which undergoes change, while the activities of life are, on the other hand, agents of a change that takes place in such a way, that not only is the energy conserved, but also the organization in which the activities themselves reside, and this not merely as an aggregated resultant, like a crystal, but as a stable relation which, itself an integral element in the occurrence of the change, nevertheless remains unchanged. The activities of life may indeed be active only when the physical forces are active, but the conservation of itself—or, in other words, the fact that life, in fulfilling its functions, does not undergo disintegration—is unique, and sufficient in itself to mark off the activities of life from all activities of the order of the physical forces. And the true distinction between organised and unorganised matter—that is, between life and what we commonly call matter—is not that the one is organised and the other not, but that the organization of the one is perpetuated under changes, while the organization of the other undergoes change with changes, and is itself a term in the series of changes.

And that the activities of life are not of the order of the physical forces, is further and perhaps best illustrated by the power of movement resident in every form of life—both plant and animal. All evidence goes to show that this power of movement, though related to forces as stimuli, is a property peculiar to life, and not in itself a physical force. The rhythmic movements of plant and animal life, as also the higher phenomena of movement seen in the automatic action of the nervous system in animals, and in the movements which

simulate the physiology of nerve tissue in plants, are responses of the organism tending to the conservation of life under particular conditions of existence: and these, though taking place with uniform regularity under appropriate physical conditions, are one and all incapable of explanation as pertaining to movements of the purely physical order. De Candolle's explanation of heliotropism, for instance, as due to the more rapid growth on the shaded side of the plant, and Hoffmeister's account of geotropism as directly caused by the tension of tissues, are neither of them capable of accounting for the respective phenomena; and the balance of evidence is decidedly in favour of Pfeller's view, that light and gravitation act, in these phenomena, merely as stimuli and releasing forces in manners decided by the organization of the plant.<sup>1</sup> Indeed, the fact that the physical forces act only as stimuli, is universally admitted in the case of nerve phenomena; and the same admission, there is every reason to conclude, must also be made with regard to the movements of plants which simulate the physiology of nerve tissue—such as the movements of the carnivorous plants, which not only possess digestive powers like those of an animal, but also structures affected by stimulation waves; of the sensitive-plant which, habituated to the wind, withstands its constant shaking, and sometimes even bends at night when not disturbed, as if dreaming; of the crocus, which is influenced by changes of temperature, and, for the preservation of its pollen, is known to close its petals under the shadow of a cloud, lest a possible shower of rain should injure it; such as also the internal periodicity, found in many species of flowers, corresponding to the alternations of temperature and light to which they are subject, which so far becomes a matter of habit as to pass in a great measure beyond the control of artificial raising and lowering of the temperature; and finally, such as the very striking movements exhibited in the growth of the roots of plants where, in addition to the power of geotropism, the root tip has a slight swinging motion, which enables it to wriggle its way between the particles of earth in a loose soil,

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<sup>1</sup> See F. DARWIN. *Nature*, vol. xliv. p. 414.



and is also apparently sensitive to the contact of solid bodies, and either turns aside from them, or, when the tip itself is free, bends round them.<sup>1</sup> All these phenomena approximate so closely to the automatic actions of the nervous system in animals, that we cannot avoid giving to them precisely the same explanation, namely, that of a response of the organism to particular kinds and degrees of stimulation.

We must be careful, however, in thus distinguishing vital from physical possesses, that we do not read into the distinction a meaning which the facts of the case do not warrant. Granted that the activities of life are not activities of force, it does not follow that life is not a material organization. Material organizations may not be limited to the phenomena of the strictly physical order of evolution. And the popular opinion, which has grown up from the reiteration of the phrase that all life is derived from prior life, that it is impossible for living protoplasm, not possessing adaptations, to have ever arisen from the matter of the physical universe, is probably as unsound as it is unwarranted. We have grounds for concluding that the structure of protoplasm is in accordance with the molecular constitution of matter; and if we are incapable of understanding how the peculiar properties of life are to be associated with molecular matter, we must remind ourselves that we are as little capable of understanding even the simplest molecular constitutions, such as those of oxygen or hydrogen.<sup>2</sup>

Further, we may as well say that because no new chemical elements can now be formed, they were therefore never formed,

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<sup>1</sup> Prof. H. MARSHALL WARD. *Nature*, vol. xxi. p. 183.

<sup>2</sup> A speculative note may here make the argument a little clearer. If there be in the universe a formative principle ceaselessly engaged in the establishment of new relations, this principle may prevail not only in the advancement of the line of each order of evolution, but also in originating the physical bases of each new order. So that conceivably under what we may call its creative action, we had first the origination of the static properties of matter as seen in the chemical elements, and next, after a due course of evolution, the origination of the dynamic properties manifested in life; and it is not inconceivable that the action of such a principle may also have prevailed in the origination of the nerve cell (see note, chap. vi. § 4, p. 161).



as say that because life cannot be spontaneously generated, it was therefore never generated from physical matter. We must not impose upon the problem of the origin of life conditions which do not apply to it. All life is certainly derived from prior life; but to every form of life which now exists there is super-added to the conditions of life the condition of adaptation; and the task to evolve life, *plus* the adaptations of life, is totally different to that of the evolution of life. Every life-form has a history; and before a single life-form could be artificially generated, the results of this history, as manifested in adaptations, must be generated also. And, though Nature itself does this in its own laboratory whenever a life-form is born into the world, and the history of the race is in its typical outlines repeated in the foetal growth of the individual, it is manifestly beyond the power of experiment.

### § 2. *The Process of Evolution in Life-forms.*

We are not justified by facts, nor even by probable hypotheses with regard to facts, in separating by a sharp line protoplasm from matter. We are justified, however, in recognising in protoplasm a new endowment of root-properties, similar to the endowment of the root-properties of the atom and the molecule. And we find that, analogous to the physical order of evolution, there arises with these root-properties as base a distinctive protoplasmic order of evolution.

All forms of life possess a protoplasmic base, and where the life-form is no longer simple the change has resulted from the association of protoplasmic cells into a corporate form of life. Every living thing exercises the function of assimilation, reproduces its like, and possesses the power of movement. And in the higher forms of life these root-properties become distinctive acts of separate organs. The plant is nourished by means of its roots and the chlorophyll cells of its leaves. And in animal life the nourishing organs are seen in feelers, fins, and limbs, which permit the animals to move and hunt for their food, in mouths which enable them to seize it, in digestive organs which prepare the food for assimilation,

and in the circulatory system of the heart and blood-vessels, which convey the same when prepared to every part. In animals there are also special respiratory apparatus for the absorption of oxygen, and further contrivances for securing the health of the body. Again, in both kingdoms there are organs of reproduction adapted to the various means by which species are multiplied; and in plant life in particular there has grown up around the reproductive process an elaborate and noteworthy series of contrivances to secure fertilization and protect the seeds. Finally, the power of movement, though not without special evolution features in plant life, presents in animal life peculiar and characteristic features in the separation of its functions into the contractility of a muscular system, and the excitability of a nervous organization, for the purposes of controlling and directing the body, and further subserving the needs of life.

And this differentiation of the functions of life may be roughly described as due to the progressive rise of a division of labour under the distinctive processes of the variation of structures, and the inheritance of ancestral characteristics, the former of which is, in all probability, ultimately connected with the reactions that take place between the organisms and their environment, and the latter with certain adaptations of the reproductive property, which enable the characteristics of the parent to be perpetuated to the offspring. And in elucidating the mode of operation of these processes it will be advantageous to leave that of variation until we deal with the law of the process, and here confine ourselves to the process of inheritance and the adaptations of the reproductive property, which make it possible.

In the lowest and earliest form of life, which we may assume to have possessed a body homogeneous throughout, reproduction probably took place as a process of multiplication by simple division into two. But when life-forms became differentiated so that their parts were not all alike, special means must have been adopted to secure the transmission of their parts. And we had therefore the formation of a nucleus, with which in all known forms of life the process of

reproduction is inseparably connected.<sup>1</sup> A. Gruber's experiments on infusoria show that, though artificially separated fragments of infusoria without any portion of the nucleus can live for a time, they are never able to regenerate themselves, whereas fragments containing part of the nuclear substance always do so. And this testimony to the importance of the nucleus in reproduction is confirmed by the experiments of Boveri, who, first removing the nucleus from the egg of one species of sea-urchin, and then introducing the nuclear substance of another species, observed that the eggs developed into larvæ of the introduced species.

Further, the transmission of the qualities of the parent is found to depend upon a definite portion of the nucleus, the "chromosomes," that is, "the rod-like, looped, or granular, bodies which are contained in the nucleus, and which become deeply stained by colouring matters."<sup>2</sup> Preparatory to all cell-multiplication there occurs a division of the nucleus of the cell, and in the process of the division of the nucleus in both plant and animal cells the behaviour of the chromosomes is strikingly suggestive of their importance. The finer threads which connect the coarser chromatin fibres first disappear, and the chromatin elements, which were previously scattered, arrange themselves in an irregular spiral thread, extending throughout the nucleus. This thread then becomes divided into loops, or rods, of fairly equal length, and of about twenty in number; and each chromatin loop, or rod, is next split longitudinally by internal forces into two equal parts. A spindle-shaped figure then appears in the nucleus, which loses its membrane; and the chromatin rods group themselves in a ring around the equator of the spindle with their free ends outwards. The halves of the longitudinally split rods are then gradually drawn further apart towards the opposite poles of the spindle, where they arrive and form loops; and around these loops a membrane appears

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<sup>1</sup> This statement is made with reference to the fact that closer observation reveals the presence of a nucleus in life-forms where none were formerly thought to exist, and that therefore the number of primitive organisms in which no nucleus is found is steadily decreasing.

<sup>2</sup> Professor WEISMANN. *The Germ Plasma*, p. 23, Eng. Trans.

and a daughter nucleus is formed. Then in these daughter nuclei the chromatin rods, or loops, immediately break up, and become "scattered in the form of minute granules in the delicate nuclear network, so that finally a nucleus is formed of exactly the same structure as that with which we started."<sup>1</sup>

And basing his views on this behaviour of the chromosomes, Professor Weismann has put forth an hypothesis, supported in every particular by the testimony of additional facts, which we may take to be the most probable of the hypotheses which seek to explain the means whereby the forms of life are able to reproduce their like, and, at the same time, manifest an amount of variability sufficient to permit new species to arise.

The egg of an animal, or the seed of a plant, is a true cell; and from the simple egg-cell countless millions of cells are produced, which run through a definite series of developmental changes, and build up an organism like that to which the egg-cell owes its origin. This development, says Professor Weismann, depends "on a series of gradual qualitative changes in the nuclear substance of the egg-cell." And using the term *idioplasm* to represent the substance which, contained in the chromatin bodies, controls any particular cell and its descendants, he tells us that a division of the nucleus accompanies each qualitative change in the idioplasm, and that in this process of division the different qualities are distributed between the resulting halves of the chromatin rods. The potentialities of the idioplasm are, however, all contained in its first developmental stage. And applying the term *germplasm* to this first developmental stage, he gives the following hypothetical explanation of its distinctive nature and constitution.

In the *germplasm*, a group of molecules exhibiting the primary vital powers of assimilation and reproduction is called a *biophor*. These biophors are the bearers of the qualities or characters of the cells, and there are as many different kinds

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<sup>1</sup> Professor WEISMANN. *The Germ Plasma*, p. 26.

of them as there are varieties of cell-structures. They contain both the morphoplasm of the cell-substance and the idioplasm of the nucleus; and migrate from the nucleus into the cell-body. And heredity, in unicellular organisms, depends on their periodic or occasional migration, and also "on the fact that all the different kinds of biophors which are required for the construction of the body are present in the nucleus in a latent condition and in definite proportions," and probably also in a definite form of arrangement or "style of architecture." But that heredity may be possible in multicellular organisms the germplasm must be composed of as many units "as there are transmissible parts of the body independently variable from the germ onwards." And to the particles of germplasm corresponding to the cells or groups of cells independently variable, Professor Weismann gives the name of *determinants*. None of these determinants can be smaller than a biophor, for variation is a biological and not merely a physical element. The determinants are therefore vital units of a higher order than the biophors, and consist of groups of biophors, having special qualities of their own and possessing the power of multiplication. Furthermore, to reach the right cell and the right position in the course of development, the determinants must be definitely localized in the germplasm, and "must therefore constitute a definitely-limited aggregate or higher vital unit" of a third order. This third vital unit, which possesses all the root-properties of life, and which is composed of thousands or hundreds of thousands of determinants, is called an *id*. And in the process of development the *id* is gradually disintegrated into smaller and smaller groups of determinants—this process being controlled by the co-operation of three factors, the inherited architecture of the germplasm, the unequally vigorous multiplication of the various determinants, and possibly the forces of attraction situated within each determinant, and resulting from its specific nature as a vital unit. Theoretically, one *id* would suffice for development; but the phenomena of heredity, as seen in sexual reproduction, and even in asexual, indicate "that the germplasm does not consist of a single *id*, but of several." And each rod-like mass



of chromatin is probably equivalent, not to a single id, but to an aggregation of ids, called an *idant*. The ids are the small granules which are known to form the idants in many animals; and when in the division of the nucleus a rod becomes split longitudinally, each of the ids composing it becomes halved, each half passing with the idant to which it belongs into one of the two daughter nuclei. Also it is to the changes that take place in the architecture of the id during the process of continued division that the transmission of characters determining not only the class, order, family, and genus of an animal, but also its structure, is exclusively due. With repeated divisions there is a diminution in the number of kinds of determinants, until finally each cell contains the single kind of determinant which controls it, and the determinant having then reached its destination breaks up into its constituent biophors.

Such, according to Professor Weismann, is the composition of the germplasm, and its relation to the development of the individual. But to account fully for all the phenomena of heredity we must suppose that there is also formed an accessory idioplasm which remains inactive until the occasion for its use arises. And, as leading up to his great doctrine of the continuity of the germplasm, we proceed to give Professor Weismann's views with regard to the way in which he conceives an accessory idioplasm to be operative, first in the regeneration of lost parts and the multiplication by fission, and next in the multiplication by gemmation and the production of unicellular germs.

The faculty of regeneration is an adaptation to prevent the species from perishing. And so long as young cells remain which contain determinants of the same kind as the cells which are lost, new cells can readily be formed, as in the replacement of the cells of the epidermis of the higher vertebrates. But where entire parts of the body are regenerated, such as the tail or the limbs, no cells of the same kind remain, and the cells of the parts capable of originating regeneration must, in addition to the determinants which control them, also contain supplementary determinants. These supplementary



determinants are the primary constituents of the parts to be regenerated, and, supplied to the body at an earlier developmental stage in the form of "inactive accessory idioplasm," they correspond to parts to be subsequently formed. In this way, it may be assumed, a portion of the determinants required for the formation of the subsequent parts becomes split off, and remains inactive within the cell until a need for regeneration arises. And this gives a full and sufficient explanation of the phenomena as seen in the regeneration of the fore-limb of a newt. A further development of special regenerative determinants is, however, required for those cases in which the process of regeneration takes a shorter course than in the primary development of the parts lost, as in the regeneration of the tail of a lizard, where the lost parts of the spinal cord and vertebral column are not renewed. Further, the process of reproduction by fission, as it takes place in certain species of worms, is probably derived from that of regeneration; and the "regenerative process, which renders fission possible, must be traced to the doubling of certain groups of determinants in the idioplasm, so that half of them remain latent."

Next, in the process of multiplication by gemmation, which is essentially different from that of reproduction by fission, we must assume, as it occurs in the hydromedusæ, "that certain cells and series of cells in the ectoderm are provided with an accessory idioplasm, which contains all the determinants of the species, and which is therefore a kind of germplasm, though perhaps not quite identical with the germplasm proper." Further, as it occurs in the case of the polyzoa, two kinds of cells (those of the ectoderm and the mesoderm), and in the case of the tunicata three (those of the ectoderm, mesoderm, and endoderm), must likewise be furnished with appropriate accessory idioplasm. And as a matter of inheritance, Professor Weismann says, "gemmation must have originated by a doubling of the germplasm taking place in the fertilized egg, so that one half remained inactive, and was then either passed on as inactive 'blastogenic' germplasm, or else became divided in the course of ontogeny into groups, which were passed separately to the same region, viz.,

that of the bud.”<sup>1</sup> Also, in those species in which alternations of generations occur, as in mosses, horsetails, and ferns, two kinds of germplasm must be assumed, “both of which are present in the egg-cell as well as in the bud, though only one of them is active at a time and controls ontogeny, while the other remains inactive.” Finally, “the formation of germ cells,” he continues,<sup>2</sup> “is brought about by the occurrence of similar processes in the idioplasm to those which cause gemmation. One part of the germplasm contained in the fertilized egg-cell remains inactive and unalterable, that is, it does not immediately become disintegrated into groups, but is passed on in the form of accessory idioplasm to certain series of cells in ontogeny, and thus reaches the parts in which germ-cells are to be formed.”

And in explanation of the continuity of the germplasm, he tells us: “As each somatic cell is only controlled by one of the large number of determinants belonging to the germplasm, and as determinants cannot be produced spontaneously, those cells which are to give rise to germ-cells must contain unalterable germplasm in addition to the active determinants which control them; and the former can only be derived from the cell to which the whole organism owes its origin, for this alone contains the whole of the determinants organically united to form germplasm. A series of cells containing germplasm in the form of unalterable accessory idioplasm must, therefore, be traceable from the egg-cell to that region of the body which, sooner or later, gives rise to germ-cells—that is, there must be a continuity of the germplasm.”<sup>3</sup> The germplasm of the germ-cells is thus handed on directly from the parent to the offspring; and as the germplasm cannot be formed from the idioplasm of the body-cells, it follows that acquired characters cannot be inherited. The germ-cells of an individual are in all their essential elements derived directly from the parent germ-cell; and the germ-cells of all succeeding generations are merely pieces of the same substance as the first, which “when

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<sup>1</sup> *The Germ Plasma*, p. 457, Eng. Trans.

<sup>2</sup> *Ibid.*      <sup>3</sup> *Ibid.* p. 228, Eng. Trans.

nourished under similar conditions, run through a similar series of stages of development and yield the same final products."

Further, extending his theory to other adaptations of the reproductive property, Professor Weismann points out that, since the molecular structure of the germplasm is already determined within the embryo, the process of sexual reproduction is one of great moment in conferring on life-forms a basis of variability. This process is essentially one of fertilization; and in explanation of it, it is stated that in the minute molecular structure of the germplasm all the potentialities of the development of the egg-cell are contained; and that, supposing we were present at the origin of sexual propagation, "we should then observe the union of two different germplasms, both of the same size and quantity, but of slightly different molecular constitution, one coming from one parent and the other coming from another."<sup>1</sup> Both are homogeneous in their properties, and uniting they "form together the nucleus of the fertilized egg which develops into a new individual of the second generation. This individual will form again germ-cells, and each of these germ-cells will contain a germplasm, which is not homogeneous as before, but composed of two halves derived respectively from the two parents."<sup>2</sup> And in succeeding generations, all of which are sexually propagated, the germplasm will attain a more and more complicated constitution, as it combines different ancestral plasmas, until it reaches the limit when the number of ancestral plasmas attains to the number of primary elements of germplasm. Then further modification by sexual propagation will only be "possible by halving the number of ancestral plasmas contained in the germplasm"—a process which actually occurs in what is known as the "reducing division" of the nuclear matter of the germ-cells, which division does not "consist in the idants becoming split longitudinally, and in their resulting halves being distributed equally amongst the

<sup>1</sup> *Nature*, vol. xxxvi. p. 608.

<sup>2</sup> *Ibid.*

two daughter nuclei as in ordinary nuclear division, but in one half of the entire number of rods passing into one daughter nucleus, and the other half into the other." Eggs which need to be fertilized undergo two consecutive divisions, the number of idants in the mother-cell becoming doubled before the first division takes place, so that after the second division there still remains half the original number of idants; while eggs which develop by parthenogenesis, such as those which produce the drones of the honey-bee, undergo one only, and embryonic development begins without delay.

Fertilization must therefore, on this hypothesis, be understood to be "no longer an unknown impulse given to the egg-cells by the entrance of a spermatozoon," but simply as "the union of the germplasms of two individuals." "There are no such things as male and female nuclear substances, but merely male and female cells, carriers of the immortal germplasm." And sexual propagation, as an adaptation of life-forms, conserves and multiplies the "individual variability which owes its first origin to the protozoon condition" of every form of life, and further provides the material for the development of individual variations out of which new species are produced.

So far we have carefully followed Professor Weismann in the exposition of his views in which he endeavours to connect the phenomena of heredity, and in a secondary degree those of variation, and consequently also those of adaptation, with the reproductive property; and we need not follow him further into his discussion of the effects of sexual reproduction on the development of the individual. We may note, however, that independently of the scientific value of his hypothesis, as the most probable explanation of the class of facts with which it deals, it has a special value as emphasizing the fact, which might antecedently have been surmised from the analogies of the orders of evolution, that the reproductive property of protoplasm, regarded in its root form as a process of simple division into two, has preserved its original characteristics intact throughout all the manifold adaptations that have been gathered around it.

And whether Professor Weismann's hypothesis be true or, as Dr. Romanes contends, it be even more speculative than the hypotheses it seeks to displace, we may so far conclude, from the nature of the facts with which it deals, that the evolutionary processes of life are inseparably connected with the adaptations of the reproductive property. And here, before proceeding further, it may be well to say a few words with regard to the position in evolution of the other root-properties of life.

The assimilative property of protoplasm is that by virtue of which a living body takes up into itself external substances to repair its tissues and increase its vigour. And with reference to its assimilative function, every protoplasmic cell has a definite period of activity from its birth to its maturity; and when it reaches maturity it either divides and reproduces new cells, if it has retained its reproductive power, or begins the process of decay and dies, if it has lost its reproductive power and become a modified cell fulfilling a function in a corporate body. The same is true of all life; and in every form of life throughout the successive stages of birth, growth, maturity, decay, and death, the whole life may be regarded as an extended assimilative activity, however complex the organism or prolonged the life.

And in every form of life the assimilative process is essentially the same. In the process of evolution there has been gathered round the assimilative property a variety of adaptative features; a division of labour has taken place; certain cells have lost their reproductive power and become formative of the tissues of the body, and others have become subsidiary to the general life of the organism, and carry on the secreting processes necessary for the elaboration of food or the avoidance of waste products; but the assimilative process has remained essentially the same throughout, and become modified only so far as the materials necessary to it have been derived from diverse sources and elaborated by different methods.

Plants in general act upon inorganic substances and convert them into organic; and animals feed on vegetable tissues or on



the tissues of other animals; but in both plants and animals the function of assimilation is the same, and takes place under the same conditions. In each, heat is necessary and in each food is required to maintain the vitality and vigour of the constituent parts. The food is only taken from different sources and elaborated by different methods; and the differences in method arise simply from the different relations which plants and animals maintain with regard to the system of energy. The waste of an animal body is incessant, and food is constantly required, in a great measure already prepared, to supply the loss of tissue; while in general the plant builds on, and stores up the energy it receives.

Nor is the nature of the assimilative process changed under all the adaptations of the digestive, nutritive, and respiratory functions of animal life. Assimilation of food is essentially the same in man as in the lowest animal; and only the means of acquiring food, conveying it to the proper quarter, and getting rid of the waste products have been changed. When food is taken into the human body it is acted upon by the saliva of the mouth, the gastric juice of the stomach, the pancreatic fluid of the pancreas, and the bile of the liver; and is then absorbed by the lymphatic vessels and poured through the thoracic duct into the blood. By the blood it is conveyed to the tissues of the body; and as the blood lies round and bathes the tissues, each element of tissue takes from it what is needed, or adds to it what is necessary to be carried away. And what takes place with regard to the food consumed by man is, making due allowance for the different adaptative features, true of all animal life. In all animal life the blood is the handmaid of the assimilative process, and has constantly supplied to it from the digestive organs new corpuscles, new fibrine, and other materials to repair the waste and promote the growth of the tissues of the body.

The power of movement we find to preserve its original characteristics only in the plant life of the earth, and to have become in animal life modified at a very early stage into the special functions of nervous and muscular tissue.



But though there is every reason to think that its manifestations are, in plant life at any rate, strictly in accordance with protoplasmic processes, there are nevertheless problems connected with this property of life which make it inexpedient that we should here do more than draw attention to the fact that in relation to the protoplasmic evolution the movements of plants and animals are in strict subordination to the assimilative and reproductive properties. Every movement acquired by a plant or an animal stands in definite relation either to the nourishment of the individual or the preservation of the race. And it is noteworthy that in plant life, where the power of movement is restricted by the imprisonment of the protoplasm in confining walls, the energies of life have been mainly spent in the preservation of the species, and the most characteristic adaptations of movement are those which are connected with the reproductive property; while in animal life, where movement has been unrestricted, the individual has become of importance as well as the race, and the characteristic adaptations are those in which the power of movement, becoming subsidiary to the assimilative process, has enabled the individual to search and hunt for its food.

Assimilation, reproduction, and the power of movement, are the root-properties of life; and from the basis of these properties, by the assumption of adaptative features, life has progressed on the earth until every available sphere, presenting the conditions suitable for existence, has become filled with appropriate forms of life. There are plants and animals suited to a high temperature and others to a low, some flourish in a damp atmosphere and some in a dry. There are animals fitted for life in the water, the soil, and the air; some feed on one kind of food and others on another; and each possesses appropriate organs for capturing and digesting its peculiar food. Wherever life could live it has lived; and in any locality a complex order of relations is observed to prevail among the various kinds of plant and animal life which inhabit it. The insect and the flower mutually support, the one the perfect life of the other; and if we change, by

domestication or otherwise, the mode of life of a single organism, the change instantly affects numerous other organisms, both plant and animal, whose healthy existence was dependent on the mode of life that has been changed, or possibly, whose struggle to barely subsist was due to its inimical influence.

We must look for the beginnings of life in the waters; and from an instructive lecture by Professor Moseley,<sup>1</sup> we learn that it probably began in the shallow waters of the sea-shore. There the waters, aerated by the surf, would be more than elsewhere favourable for respiration; and the first land-growing plants would establish a source of food, and render possible the colonization of the land by land animals. There also the alternations of the tides, and the action of the waves, would give the varying conditions suitable for the differentiation of the main groups of life.

On the sea-shore we find animals which have become admirably adapted to the conditions of their life, one form burrowing deep in the sand, another clinging tightly to the rocks, and another possessing hard shells, or skeletons, to protect themselves. And the common origin of all these is strikingly shown by the fact that they are all developed from free-swimming larvæ, which are closely alike for many species and genera. The larva known as the trochosphere, globular in form, and swimming by means of ciliæ, is common to a very large number of molluscs and many species of annelids. The various tribes of echinodermata—sea-urchins, star-fish, brittle stars, and holothurians—have also a common larval form that has a free-swimming existence. So also have the fixed and inert sponges and the coral-building madreporæ. And all evidence points to the fact that even the primitive ancestors of plants were also free-swimming.

Professor Moseley finds the origin of all the various forms of animal life in a free-swimming ancestral form; and, though his view that these forms partly inhabited the open sea and led a pelagic life has been questioned, there is no question that they

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<sup>1</sup> "Fauna of the Sea Shore." *Nature*, vol. xxxii. p. 419.

originally swarmed in sheltered bays and pools on the sea-coast as the larvæ of littoral animals do now. From these forms, the littoral zone first became stocked with life specially adapted to the conditions of the shore, and then gave off colonists to the three other faunal regions of the dry land, rivers, and deep sea. And every terrestrial vertebrate—every reptile, bird, and mammal—bears evidence in its developmental stages, in the gill-slits perforating the throat, of its aquatic ancestor.

But while the fauna of the coast have given rise to the land and fresh-water fauna, the coasts and seas have also received back again from the land and rivers forms which have again become adapted to life in the waters. Such are the seal, walrus, whale, porpoise, and dolphin, derived from the two great branches of the placental mammals; certain shore birds, the polar bear, and even species of insects.

Also the deep-sea fauna have probably been formed from the littoral forms, not in remote antiquity, but after food derived from the littoral and land life had become abundant in the deeper ocean beds. And here we may mention the deep-sea fish, with their peculiar phosphorescent lamps and scales, living in the still waters, and presenting to us the survival of the ganoid fish, once numerous and important in the life of the earth, but now, with few exceptions, confined to these deeper zones.

### § 3. *Analogy of the Evolution of Life to the Evolution of Matter.*

We have now reviewed, at what we fear has been a tedious and uninteresting length, the main outlines of the protoplasmic organization of life. We have seen, at the base of the organization of both plant and animal life, the protoplasmic cell moving and contracting, feeding and reproducing its like; and then, in order to exercise these functions with more effect, colonies of units working together, and a division of labour arising. The assimilative, reproductive, and moving powers become divided, and attached to separate groups of cells; and proceed to gather, each around itself, through the medium of the reproductive process, adaptations in an ascending

scale of complexity, with also occasional reversions to a lower type.

And in this evolution of the protoplasmic functions, we have an instructive parallel to the evolution of the properties and forms of matter. Protoplasm and its functions are comparable to ordinary matter and its resident energies. In each there exists a basis of unchanging units, the cell and the atom; in each there are certain resident activities, assimilation, reproduction, and the power of movement, answering to molecular motion, mechanical motion, chemical action, electricity, and light; in each there takes place a process of evolution, the adaptative features in the one case corresponding to the integrations of matter in the other. And it remains for us to carry this analogy a step further, and make manifest that the protoplasmic evolution is directed and controlled by conditions which are comparable with the physical condition of the conservation of energy.

The evidence we have adduced enables us to conclude that the rise of adaptations takes place, essentially, as a process of differentiation of the functional activities of protoplasm, in order that the operations of Nature may be used to the advantage of life. This differentiation is secured, on the formative side, by the plasticity of the protoplasmic structure permitting variations to arise and special structures to be evolved for particular needs, and by certain adaptations of the reproductive property which lend themselves to securing the inheritance of ancestral characteristics, together with a secondary order of variations. A division of labour takes place, and slowly perfects itself as the structures become adapted to the better performance of the functions. And we have now to make manifest that these processes take place under fixed conditions, and that it is wholly, or in a degree immeasurably exceeding that of any other factor, the work of natural selection to seize and make permanent those variations which are of utility to the organism.

§ 4. *The Law of Natural Selection.*

It is, perhaps, premature in the present state of knowledge to discuss the general causes and conditions of the variability of the forms of life. It was the opinion of Darwin that all forms of life change only through the influence of changing external conditions. "Variability," he says, "is generally related to the conditions of life to which each species has been exposed during several successive generations."<sup>1</sup> He does not, however, by these words mean what the philosophical evolutionists understand by them, viz., that external conditions exercise a direct effect upon the organism; but rather that change of conditions, however slight, leads to a breaking down of fixed characteristics, and gives to long-lost or new characters an opportunity to manifest themselves. And with the views of Darwin the scientific evolutionists, in general, substantially agree. Professor Weismann tells us that "the two forms of amphimixis—namely, the conjugation of unicellular, and the sexual reproduction of multicellular organisms—are means of producing variations." But the process of amphimixis, he continues, is not the primary cause of hereditary variation. It blends the specific variations already existing in a species, but is incapable of giving rise to new variations; and the primary cause of variation must be the effect of external influences on the biophors and determinants. The biophors and determinants, he says, "are subject to continual changes of composition during their almost uninterrupted growth, and these very minute fluctuations, which are imperceptible to us, are the primary cause of the greater deviations in the determinants, which we finally observe in the form of individual variations." Further, treating of their specific causes, he considers the incessant changes in the biophors and determinants to be due "to the constant recurrence of slight inequalities of nutrition in the germplasm." And in explanation of the rise of variations in life-forms, he tells us that the effects of these changes in the biophors and determinants, at first infinitesimal, may accumulate

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<sup>1</sup> *Origin of Species*, p. 106, and *Descent of Man*, p. 28.



and so eventually cause deviations "in the structure of single determinants, or groups of them—never, perhaps, in all the ids at once, but, at any rate, in several, or even many of them." Then, as an adaptative feature of the reproductive property, the process of amphimixis comes in and aids in the accumulation of these modified determinants, so that finally there is offered to selective influences "manifold combinations of characters," from which a proper choice can be made.

But however caused and conditioned, the point of chief importance is that the variations of life-forms do nothing more than supply the raw material out of which adaptations arise. And it is the glory of Darwin to have established the fact that variations have their function in the formation of adaptations strictly subordinated to natural causes, of which by far the most important is that of natural selection, which seizes upon and makes permanent such variations of structure as favour the organism in the struggle for existence. "All organic beings,"<sup>1</sup> he says, "are striving to increase at a high ratio, and to seize on every unoccupied, or less well occupied place in the economy of Nature." And as the forms of life have multiplied upon the earth, a severe and persistent struggle for existence has arisen between closely allied forms; and a selective process has unceasingly favoured those organisms which, in the struggle for existence, have been most in harmony with the conditions of life. The fittest for the particular conditions at any time and place survived; and the rest, handicapped in the struggle, in time died out. Thus there has been produced a gradually rising scale of plant and animal life; and though certain forms of life have existed much the same from the earliest times to the present, such as the *lingula* of the Silurian beds, and many foraminifers, these only prove that some organisms remain which are fitted for simple and stable conditions of life. As Darwin says with regard to them:

"When advanced up to a given point, there is no necessity, on the theory of natural selection, for their further continued progress; though they will, during each successive age, have to be slightly

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<sup>1</sup> *Origin of Species*, 6th edition, p. 68.



modified, so as to hold their places in relation to slight changes in their conditions." (*Origin of Species*, p. 308.)

Natural selection accounts for adaptation as related to the preservation of the species in the presence of competing organisms, and disadvantageous conditions in general. But it is the race and not the individual which it conserves. Individuals are favoured only in so far as their development is to the advantage of the species, or in harmony with its welfare; and in almost every form of plant and animal life, burdens are imposed on the individual, particularly in relation to the reproductive process, for the sake of the species. Furthermore, the action of natural selection, though characterised by the improvement of races and species, does not of itself necessarily lead to improvement of type. In most animals degeneration occurs of ancestral structures which are no longer of utility in the battle of life; and in some organisms, where the struggle for existence has been reduced to a minimum, actual degeneration of type has ensued to a very remarkable degree.

Improvement of type takes place, and adaptations arise in an increasing order of complexity, as structures already fulfilling a function become adapted to fulfil it under more complex conditions, or as structures developed for one function take up the office of a second function, and become transformed so as to fulfil exclusively the second. Excellent examples of the first kind of adaptations are seen in the diversity between the limbs of reptiles, birds, and mammals. In the earliest reptilean forms, such as the ichthyosaurus and the plesiosaurus, the correspondence between the fore and hind limbs is most complete; and the differences which are observable in the later avian and mammalian forms are all due to the rise of adaptations fitted to support the body under particular kinds of motion. Some species, it is noteworthy, retain curious evidence of the original correspondence; the bat's wing, for instance, is a hand, and yet some bats have a knee-pan on the elbow joint. And others manifest to an extraordinary degree the development of some particular feature; as, for example, the hoof of the horse, which is a development

of one toe of the foot of an originally five-toed ungulate. A good example of the second kind is seen in the air-bladder of fishes, which, originally serving the purpose of floating, acquired a use as a secondary organ of respiration, and finally became converted into the lungs of land animals. And in this connection we may point out that many examples of adaptation exist, which are intermediate between the perfect adaptation to one set of conditions and the perfect adaptation to another. Only mammals, birds, and certain reptiles, have become completely adapted to terrestrial respiration; and the less perfect stages of adaptation are seen in many fishes that have modifications of the gills which enable them to survive for almost indefinite periods out of water. Such are found in the *periophthalmus*, which hops about upon the mud flats of the shore, and even climbs the mangrove-trees and rests in the branches. Further, in some cases where structures have been transformed so as to fulfil other functions, we have defects exhibited due to the secondary nature of the new function. In the axolotl, which breathes by external gills, and also by means of lungs, gill-slits, perforating the throat but having no respiratory function, still exist in the adult form, and seriously inconvenience the animal when taking food;<sup>1</sup> and a similar inconvenience, ultimately due to the air-bladder of fishes being connected with the gullet, is experienced even by man, when a crumb goes "the wrong way."

Examples of degeneration are seen in the existence of rudimentary structures in every animal, which, when not obviously due to the relation between the sexes, as in the existence of the mammary glands in man, are in general the disappearing organs of the animal's ancestry. The most noteworthy examples of these are to be found in the whale, whose ancestry has been worked out by Professor Flower, with tolerable accuracy, from the aborted structures it possesses. The whale is a placental mammal that has become adapted to a life in the sea, and in it the mammalian fore limbs have become mere paddles; but all the bones of the mammalian

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<sup>1</sup> *Nature*, vol. xxxii. p. 419.

limb exist, only flattened out and connected by flat surfaces united by ligaments instead of hinge joints; and the hinder limbs also exist as rudiments in a pair of slender bones buried beneath the skin. Also the parts of the eye which are necessary for keeping it moist, such as the movable lids, nictitating membrane, and the lachrymal gland, and which cannot be needed by the whale, have either all disappeared, or are only occasionally found in a rudimentary condition. And similarly the parts of the ear which collect the vibrations of sound travelling through the air, have become so aborted that there is no trace of the external ear; and the *meatus auditorius* exists only as a minute aperture that has no appreciable function in connection with the organ of hearing, which is in other respects essentially mammalian, and preserves all the mammalian characteristics, only deeply buried in the head. There is no trace in the whale of an organ of smell, like that of the fish, adapted to the detection of odorous substances in water; but in the whales of the whalebone kind there is a rudimentary organ of smell exactly on the type of the air-scenting mammal. And in the same species of whale, the whalebone itself is merely a modification of the ridgy membrane which coats the bony palate of mammals, particularly of the ungulates.

Finally, actual degeneration of type is found wherever the energies of life, in consequence of an abundant food supply, or the absence of competing organisms, have not been kept up to the struggling point. And as evidences of degeneration, passing over those exhibited in the parasitic forms which prey on the higher forms of life, we may instance the following. Some air-breathing insects, by adaptation to the surface film, have overcome the difficulties of living in water, and gained easy access to ample stores of food; and the head of the larvæ has in consequence degenerated, and become in extreme cases "a mere shell, not enclosing the brain, and devoid of eyes, antennæ, and jaws."<sup>1</sup> Other insects, also, which have in other ways lighted upon an unlimited supply of food, have lost the intelligence, sense-organs, and means of rapid locomotion,

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<sup>1</sup> Professor MIALL. *Nature*, vol. xliv. p. 461.

necessary to find mates and suitable sites for laying eggs, and produce their offspring from unfertilized eggs laid by wingless pupæ. The slave-holding ants have lost the power of feeding themselves. The mites of our cheese are degenerate spiders, and the barnacles of our ships degenerate crustacea. Even whole orders are subject to degeneration, as the headless lamellibranchia and the moss-polyps.

Natural selection is thus the law of the development of adaptations under a persistent struggle for existence among the forms of life. And by not a few of its advocates it is regarded as sufficient in itself to account for every inherited modification in the forms of life, and to be, not one among others, but the sole cause of the transformation of species. Other evolutionists, however, contend that there are many phenomena of life which are incapable of reduction under its law. Darwin himself has suggested the supplementary hypothesis of sexual selection as necessary to account for the brilliant plumage and other embellishments of male birds during the pairing season; and the fact cannot be questioned that birds possess an æsthetic sense which manifests itself in habits that have no reference either to utility or the preservation of life.<sup>1</sup> But these pertain rather to the psychological evolution than to the protoplasmic. And the purely biological difficulties in the way of regarding the law as the exclusive law of the protoplasmic order are stated by Dr. Romanes<sup>2</sup> to be:

(1) "That a large proportional number of specific, as well as of higher taxonomic characters, are seemingly useless characters, and therefore do not lend themselves to explanation by the Darwinian theory; (2) that the most general of all specific characters—viz., cross-infertility between allied species—cannot possibly be due to natural selection, as is demonstrated by Darwin himself; (3) that the swamping effects of free intercrossing must always render impossible by natural selection alone any evolution of species in divergent (as distinguished from serial) lines of change."

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<sup>1</sup> See Dr. ROMANES, *Darwin and after Darwin*, vol. i. pp. 330-2.

<sup>2</sup> *Ibid.* p. 374.

The first of these indicates probably nothing more than that natural selection under particular conditions does not hem in every side of the life of an organism, but leaves room for characters to establish themselves which are indifferent to the species.

The other two, however, are of more importance; and as accounting for them, Dr. Romanes himself has put forth the hypothesis of physiological selection as supplementary to that of natural selection, much the same hypothesis being also propounded by the Rev. J. H. Gulick, under the form of an elaborate series of laws of segregation. And it is probable that account must be taken of some such factors; though, as Mr. Wallace points out, since in general few individuals out of the great number of births in each generation survive to maturity, divergence of type may well result from natural selection preserving two opposite and extreme forms, both equally adapted to the conditions of life.

Be this as it may, however, we venture to think that the biological difficulties arise from taking a too narrow and confined view of the law; and that biologists have not sufficiently apprehended that natural selection operates quite as much in the sphere of general adaptative conditions as in the sphere of particular adaptations. We have an instance of its operation in the sphere of such conditions in the rise of the process of amphimixis; and "the segregation of the fit," which we may take as an alternative term for physiological selection, may very well be regarded as itself an adaptation on the same plane with other adaptations, such as the process of amphimixis, which, themselves due to natural selection, become factors of variation, and offer material to selective influences. All divergences of type, though possibly not immediately due to natural selection, become established simply because of their fitness for the conditions of life, and their ultimate cause may well be a process of selection. As Professor Meldola puts the matter:—

"If diversity is an advantage, natural selection can deal with it like any other advantageous character, and *would seize upon any means afforded to secure its perpetuation*, provided always that the



divergence was in the direction of some unoccupied place in the economy of Nature.”<sup>1</sup>

Varieties less fertile with the parent form, and presenting divergences, would tend to survive; and a slight sterility thus offered to natural selection might well become intensified until perfect sterility resulted.

The general drift of thought among scientific evolutionists is to regard the law of natural selection as of paramount importance, yet, when seeking to explain adaptations which cannot apparently be brought under the law, many evolutionists of the scientific school manifest a leaning towards the views of the philosophical evolutionists. And even Darwin, with his characteristic humility, is found on occasion to incline to the philosophical views, when the difficulty of applying the scientific view has appeared to be extreme. Sufficient attention, however, has not been given to the purely speculative nature of the tenets of the philosophical school.

In Spencer's system of evolution, all the orders of evolution are derivative from the first, or rather the same general principles are regarded as prevailing in the succeeding orders of evolution as prevail in the first. And though this is not the place to enter upon matters of philosophy, we may nevertheless point out in the first place that the assumptions involved in this position are not supported by the evidence of science, and in the second place that the difficulties in the theory of natural selection, which are assumed to lend countenance to the philosophical views as applying to the protoplasmic evolution, are difficulties which arise from misconceptions with regard to matters of fact, or with regard to the application of the law.

At the root of Spencer's system lies the assumption that the forces which pervade the universe pervade it universally, so that the whole order of evolution is simply the resultant of the reactions which these forces call forth. And his laws of the protoplasmic order are framed strictly in accordance with this

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<sup>1</sup> See Letter to *Nature*, Aug. 21st, 1886, vol. xxxiv. p. 385.



assumption. He states the law of adaptation to be an external law of direct adaptation, supplemented by natural selection (the influence of which he cannot ignore), and he subjoins as internal laws the inheritance of acquired characters, the principle of the correlation of growth, and the effects of use and disuse. The external law is the direct effect of their environment on the forms of life, and the internal are adjusting factors in the organisms themselves. And in the law of direct adaptation he assumes that external influences act upon plant and animal organisms, and modify their structures in such a way as to lead to permanent changes which are inheritable. But, however much we may observe the modification of structure by external agents in the lifetime of an individual, or the effects of use and disuse such as the development by use of the muscles of a blacksmith's arm, there is no trustworthy evidence that such modifications are inheritable. Nor has the opinion that they are so any better foundation than the vague belief which has become, through centuries of ignorance, firmly seated in the human mind. And the facts on which Professor Weismann bases his hypothesis, independently of the hypothesis itself, are conclusive that no such modifications can be directly inherited. For, granting that the soma-cells influence the germplasm, when in a state of diffusion before it has become stored up in ova or sperm-cells, there are two further conditions, both of them highly improbable, which must be fulfilled in order that the precise character of the acquired modifications of the parent may reappear in the offspring,—first, that the acquired character of the adult soma-cells passes in some form into the substance of the chromatin rods; and second, that it is reproduced from thence without change into the soma-cells of the second generation. And it is noteworthy in this connection that no answer has been vouchsafed or attempted, other than a half-hearted re-statement of Darwin's cumbrous hypothesis of gemmules, to Professor Weismann's pertinent enquiry, "How do the results of practice reach the germ-cells?" Again, with regard to the principle of the correlation of growth, it is easy to show that the assumed incapacity of natural selection to explain the complex co-adaptations, that

must in certain cases accompany a favourable variation of species, really proceeds from imposing upon the facts of the case impossible conditions. Spencer, for instance, imagines a prairie-dog to be suddenly required to adapt itself to an environment where it must acquire the art of jumping, and he enters into an elaborate explanation of the numerous co-adaptive changes which must thereupon arise in its limbs before it can perform the necessary actions. But changes of environment seldom, if ever, present themselves with such startling abruptness, and it is a sufficient answer to Spencer's argumentation to rejoin that myriads of life-forms have, even under the slowness of natural changes, perished when conditions arose to which they were not adapted. Co-adaptation, says Professor Meldola, may be due to "the coalescence (by intercrossing) of  $n$  modifications, each useful in *itself*, and acquired at successive periods in the phylogeny of the race." And such difficulties, as that of the long neck of the giraffe, disappear with the knowledge that in the Pliocene epoch giraffes were abundant in many countries, and that remains of giraffoid animals exist which approximate to the type of the deer on the one hand, and the type of the antelope on the other. It is also asked on behalf of the philosophical views, "Where, on the scientific hypothesis, are the experimental failures of Nature?" But strictly, according to natural selection, there can be no failures. No species can establish itself, except as fitted for the conditions in which it lives. Life itself implies fitness to live. And to those who push this argument home to individual cases of selection, and ask, as is done particularly with reference to the molar teeth, for evidence of non-selected new elements, it is a sufficient reply that the absence of variations in lines which point towards utility is no proof that adaptations in these directions have not been established by natural selection. Moreover, if Professor Weismann's hypothesis be true, tentative variations begin and end with the variations of the biophors and determinants, and not unless variations tend in an advantageous direction do they become accumulated, and manifest themselves as variations of species. Finally, with regard to the so-called law of the effects of use and disuse, the main

difficulty advanced by its advocates against the law of natural selection, that of accounting for the dwindling and almost complete disappearance of organs which become useless, need not be felt if, together with the theory of panmixia, we take into consideration that there would be both a survival of the young which were previously unable to live and also a reversal of the action of natural selection with respect to organs which become useless, and so a drain on the energies of life.

### § 5. *The Law of the Protoplasmic Evolution.*

We conclude, then, that we are justified by the facts of the case in regarding natural selection as a law of such predominance in the protoplasmic evolution, that all adaptative features may, directly or indirectly, be ascribed to its operation. But if we are to view it as the law of the protoplasmic evolution, we must not merely look upon it as the law of the effects produced in consequence of a persistent struggle for existence. If we do not see its dependence on some fixed principle outside the protoplasmic order, we must conclude it to be nothing more than a secondary law of the evolution process.

The law of the physical evolution is due to such a fixed principle external to it, viz., the persistence of the original organization of the universe under all the derivative interdependent organizations of the physical order; and for the law of the protoplasmic evolution there must be a corresponding principle which, if not as ultimate, is at least independent of the phenomena of which it is the law.

We ask then, in the first place, is there any such fixed principle innate in protoplasmic life? If there be, it must reside in one or other or in all of its root-properties. But all adaptations we have seen, arise initially as variations of structure; and these, though they supply the material necessary for the process of natural selection, do not directly condition the order of the process. Moreover, the variations, as presented to natural selection, are presented mediately by means of processes which take place relatively to the reproductive property; and in view of the struggle for existence, the only possible way in which they can condition the order of the

process is by virtue of the vital force which tends through the reproductive property to overstock the world. Vital force, however, depends on food supply, and is inseparably connected with the system of energy. And hence, looking internally to life for the principle of the law, we only arrive at the material conditions of the process in the supply of energy to protoplasmic bodies. We must, therefore, look elsewhere. And the only other direction in which we can look is towards the external conditions to which life-forms are adapted.

And viewed with reference to their external conditions, we observe that the adaptations of life-forms are adjustments to the conditions of life. But these conditions are part of the physical order, established in accordance with the physical evolution. And we have suggested to us that the fixed principle, on which the law of natural selection depends, resides in the fact of the physical order; and that, therefore, the origin of adaptations and the order of their development under the law of natural selection is due to the existence of an external order with which it was possible for the properties of protoplasm to enter into relation. Natural selection would thus be a law obtaining under the condition of a struggle for existence in life-forms, and deriving its stability from the inherent order of the universe; and it would be precisely because there is this inherent order, to which it is possible for life to be adapted in ever-increasing degrees of complexity, that we have the phenomena of adaptation. And this, apart from his philosophy, is in agreement with Herbert Spencer's conclusion, when he defines life to be "the continuous adjustment of inward to outward relations." For Spencer's definition of life is not a full definition, but a definition only of the garment of life which, covering the naked protoplasmic properties with adaptative elements, gives to life the manifold and various modes in which it lives. In other words, his definition is a definition of adaptation and of nothing more.

That this view is correct, the adaptations themselves demonstrate. Each life-form is in its adaptations illustrative of the external relations with which, in the course of evolution, it has entered into correspondence; and its adaptations

exist solely because of the fixity of these relations. The arm illustrates the mechanical relations of the lever, and has come to be an arm simply because these mechanical relations obtain in the universe and are serviceable to life. Again, the eye is an optical instrument illustrating the laws of light; and the independent evolutions of the eye have been possible only because of the various fixed relations prevailing in the phenomena of light. And we may state the general truth, that it is the harmonious working of the various modes of energy and the consequent fixity of relations in the physical world which has made the protoplasmic evolution possible, and enabled the manifold races of living beings to arise on the earth. The evolution of protoplasmic structures to fulfil functions presupposes an unchangeable order which makes possible the continued performance of the function; and every structure which is evolved, is evolved as the medium through which the relations of this unchangeable order become of service to life. If the refraction of light had not taken place under fixed conditions, the crystalline lens of the eye could not have been evolved; and the crystalline lens has been evolved solely because through the refraction of light trustworthy indications are given of external phenomena. And the same may be said with regard to any other of the adaptations of the organs of sense.

And here we may note that this dependence of natural selection on the fact of the physical order accounts for many of the difficulties which are advanced against it. It justifies at once the term natural selection by placing the physical order in a position with regard to life-forms in general, which is analogous to that which man occupies with regard to the forms of life under his control. It gives a full and sufficient explanation of the existence of the various types of animal life, and accounts for the general correspondence between what are possibly independent courses of evolution, such as the correspondence of the sub-orders of marsupials to the sub-orders of placental mammals. And it also explains the general resemblances which arise between species where the resemblance can in no wise be ascribed to community of descent,



such as the close external resemblance of the swift to the swallow, and the eye of the octopus to the eyes of fish.

We may summarise the process of the evolution of life-forms as one in which development has proceeded along the line of using the fixed relations of the universe to the advantage of life. And this is observable equally in the mechanical arrangements for distributing the seeds of plants, in the varied forms and hues of the flowers, and in the segmented bodies of the annelids, the shells of the crustacea, and the adaptations of fishes, reptiles, birds, and mammals. Each form of life has taken up into itself the fixed relations of the universe which were of advantage to it in the special direction of its evolution; and each reflects its own peculiar part of the wonderful harmonies of the universe. Man himself is an epitome of Nature. And we may note that the existence of man and of the entire scale of living forms gives additional weight to the inference, established from our review of the physical evolution, that the universe is, in its material aspect, a related whole which possesses an organization independent of the order of evolution, and controlling every material relation established under the evolution processes.

### § 6. *The Interpretation of the Protoplasmic Order.*

From the physical evolution we inferred that in view of the continuity of its organization, and of the progressive nature of its evolution, there must be a teleology of some kind. And now in view of the protoplasmic evolution we are prepared to advance a step further and declare that this continuity and progression are in accordance with the conception of an order prevailing in the physical universe, and assuming, relatively to the protoplasmic evolution, the character of a power controlling the form of the protoplasmic adaptative features. The formative process, as it takes place in the evolution of matter, proceeds by way of changes in the mode of energy, such as the fall of temperature and the swing of electrical conditions; and the relations which result are in every case interdependent organizations connected with the system of the interchanges of energy. But, though appropriate physical conditions are



required in order that protoplasm may exist, and protoplasm in its assimilative aspect is manifestly connected with the system of energy, the formative process as it prevails in the evolution of life has the definite function of conserving life and adjusting its activities to external conditions; and the relations which result are adaptative features whereby life is enabled to perpetuate itself under more complex conditions. Thus the process of evolution, which is manifested in matter as a progression, becomes in life a principle of adjustment. But this principle of adjustment is itself under law. No variation of a life-form can constitute an adaptation except in accordance with the law of the protoplasmic evolution; and this law is that of a natural selection conditioned by the struggle for existence, and operating in accordance with the inherent order of the physical universe. In the struggle for existence life-forms survive only by entering into more advantageous degrees of correspondence to the physical order; and the protoplasmic evolution is in every stage subordinated to this physical order. This order therefore becomes relatively to the protoplasmic evolution a power which must be obeyed; and though life-forms embody the relations of the physical order, and become expressive of the harmonies of the universe, this takes place only so far as the physical order itself permits.

More than this the protoplasmic evolution has no teleological significance. We cannot assume it to bear witness to an end other than what is to be found under the conditions imposed by the physical order; and under these conditions there is not only progression, but also degeneration in the order of adaptations. There is no evidence of an occult power controlling the kind and degree of adaptations; but equally the advancing scale of life-development, and the declining scale of parasitic growths, find in Nature their nursing-grounds and final cause. There is a power which rules over life; but this power, so far as we are able at present to infer, is purely materialistic. Nature is to life a taskmaster whose orders must be obeyed. And the utmost we can conclude is that atheism, pure and simple, which acknowledges no

order and no power, is impossible. There is an order, manifested in the physical universe, and there is a power, manifested in the control of adaptations. The order persists in every particle of matter; the power is obeyed by every form of life.

We have not, however, arrived at a final answer. Our conclusions are strictly limited by the survey of the physical and protoplasmic evolutions; and we have yet to enquire if the succeeding orders of evolution enable us to advance beyond this materialistic conception of the universe.

### § 7. *The Natural Religion of the Author of "Ecce Homo."*

The examination of the first two orders of evolution has, however, brought us into touch with the views that are held respecting the universe by those who reject the conception of a Personal God; and before we proceed with the examination of the succeeding orders, we may briefly review the practical issues of their position. These are given us in the *Natural Religion* which the author of *Ecce Homo* arrives at when he puts "religion by the side of science in its latest and most aggressive form, with the view not of trying the question between them, but simply of measuring how much ground is common to both."<sup>1</sup>

In the presence of Nature, he says, man feels himself to be in the presence of a power not himself and immeasurably above himself, "a Power in the contemplation of which he is absorbed, in the knowledge of which he finds safety and happiness."<sup>2</sup> This power the scientific man *knows* to be eternal, and strains his mind to realize its infinity. Nature gives to him the law to which his life ought to be conformed; and all happiness depends upon the knowledge of the laws of Nature, and the careful adaptation of human life to them. Nature is to him infinitely interesting, infinitely beautiful; and those who devote their lives to the contemplation of its varied laws, regularities, analogies, and suggestions of unity, "scarcely ever fail to testify to the overpowering

<sup>1</sup> *Natural Religion*, 2nd edition, p. 5.

<sup>2</sup> *Ibid.* p. 19.

awe with which from time to time it surprises them." Man knows himself to be a part of Nature; and therefore Nature gives to him all that religion asks from God, "the sense of a Power to all appearance infinite and eternal, a Power to which their own being is inseparably connected, in the knowledge of whose ways alone is safety and well-being, in the contemplation of which they find a beatific vision."<sup>1</sup>

Such is the groundwork of the religious conception of nature which the author says "seems to be favoured by great authorities" (Preface, 2nd edition), though not by the greatest. It is distinguished from atheism, which is asserted to be "a disbelief in any regularity in the universe to which a man must conform himself under penalties." "There is an Atheism which is a mere speculative crotchet, and another which is a great moral disease." The disease is wilfulness, which does not regard that there is a superior power outside "which must be considered, and in some way propitiated, if success would be had in any undertaking."<sup>2</sup>

The Nature believed in is not pitiless, but including as it does humanity, it includes "all the pity that belongs to the whole human family, and all the pity that they have accumulated, and, as it were, capitalised in institutions, political, social, and ecclesiastical, through countless generations."<sup>3</sup> An idea of the unity prevailing in the universe is attached to the conception of Nature; and a personified Nature is summed up as the god who "is the Inspirer of kings, the Revealer of laws, the Reconciler of nations, the Redeemer of labour, the Queller of tyrants, the Reformer of churches, the Guide of the human race towards an unknown goal."<sup>4</sup> It is admitted that the bare intellectual conception of the unity of the universe is not felt to be inspiring, for there is a bad side in Nature as well as a good, one which leads to decay and death and reaction, as well as one which leads to life and vigour and progress. But this is found to be filled up by a threefold religion "consisting of that worship of visible things which leads to all moral

<sup>1</sup> *Natural Religion*, p. 23.

<sup>3</sup> *Ibid.* p. 68.

<sup>2</sup> *Ibid.* p. 28.

<sup>4</sup> *Ibid.* p. 89.

disciplines, and that worship of" [we scruple here to write the name of God] "which is the soul of all philosophy and science." And the ideal life of the community under this religion is sketched as follows—

"Every one there would be alive. The cares of livelihood would not absorb the mind, taming all impulse, clogging all flight, depressing the spirit with a base anxiety, smothering all social intercourse with languid fatigue, destroying men's interest in each other, and making friendship impossible. Every one would worship; that is, every one would have some object of habitual contemplation, which would make life rich and bright to him, and of which he would think and speak with ardour. Every one would have some supreme interest to which he would be proud to sacrifice every kind of self, and by which he would be bound in the highest kind of friendship to those who shared it. The Higher Life in all hearts would be as a soil out of which many fair growths would spring; morality would be one of these; but it would appear in a form so fresh that no such name would seem appropriate to it."<sup>1</sup>

This is the scientific religious creed, as it is presented to us by one who has been called the interpreter of the age to itself. But it recognises no law except that of the physical order, and admits of no hopes which are not in accordance with the conditions which that order imposes. Its god is only such as is revealed by the operations of Nature in accordance with the law of the conservation of energy; and it acknowledges no power, no other existence but that which exists in and through the law of natural selection. The psychological evolution, however, we shall endeavour to show, brings before us an order of facts that conclusively manifests the insufficiency of such a creed as an interpretation of the universe, and effectually demonstrates that there is an order of mind which is as ultimate as the order of matter, and which must be taken into account by any system which professes to interpret the universe to man.

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<sup>1</sup> *Natural Religion*, pp. 141-2.

## CHAPTER VI.

### THE MANIFESTATIONS OF MIND IN RELATION TO PHYSICAL AND PROTOPLASMIC PROCESSES

#### § 1. *The Distinction between the Manifestations of Mind and Physical Phenomena.*

IN our review of the protoplasmic evolution we distinguished the root properties of life from those of ordinary matter, and saw in life an activity other than an activity of force. We studiously refrained, however, from entering into the question of the connection between vital phenomena and the manifestations of mind; and, disregarding the mental element present in the higher forms of animal life, we traced out the evolution of life-forms only so far as this depended on purely biological factors. But we have now arrived at the stage when the mental element in evolution can be no longer disregarded; and, however difficult it may be to contemplate the matter from the scientific standpoint, we must now enter upon a scientific examination of the relation of mind to the general system of evolution, and endeavour to arrive at a definite view of the nature and position of mental manifestations.

Our knowledge of force, as it obtains in the universe, is not a knowledge of force in itself, but of force as hypothetically the cause of physical change. And change in the physical sense of the term is a passage, under law, with respect to the mutual relation to each other of masses or molecules of matter, from one form or degree of relation to another. Gravitation, for instance, though usually described as a force inherent in the molecules of atomic matter, is in strict accuracy simply the hypothetical cause of the changes which take place,



or tend to take place, in the relative positions of masses of matter in space; and there cannot be gravitation, as we know it, unless there be at least *two* particles of matter in the universe, whose relation to each other in space admits of passage from one degree to another, or of conversion into another mode of relation; and similar statements apply to all the physical forces. The forces of the universe are convenient names for the physical processes under which changes of relation take place in matter. The relation between molecules of matter, which we distinguish as the energy of heat, is changed in fixed measures by means of force or physical processes into other modes of relation, such as those of mechanical motion, or of states of chemical separation of atoms. And the same is true of the changes and transformations in the other forms of energy. All physical processes are, in fact, changes in the relation to each other of atoms or molecules of matter from one form of relation to another. And the physical universe itself may be summed up as an order of interdependent relations established by means of changes of relation.

Further, the processes which take place in the protoplasmic world are always accompanied by changes of relation, and invariably lead to the establishment of relations in accordance with the system of changes of relation. In their assimilative aspect, plants, in general, convert inorganic matter into organic, and animals reduce organic to inorganic; and it is noteworthy that certain changes of relation, which pertain essentially to the order of chemical reactions, such as those which occur in the change of sugar to alcohol, and the reduction of alcohol to vinegar, are normally due to the activity of minute protoplasmic organisms. Also in both plants and animals the changes connected with the reproductive property and with the power of movement, likewise manifest themselves as changes of relation in the forms of matter, in the case of reproduction at a certain stage in the growth of the individual as a process of simple division into two, and in the case of the power of movement as the response of the organism to the action of physical forces as stimuli.



The difference between protoplasmic and physical changes is that in the protoplasmic changes of relation there is an unlocking of energy which cannot be ascribed to purely physical processes. A physical force gives the occasion; but the agent of the change resides in the protoplasmic body; and the change itself is one which differs from physical changes in the fact that certain relations taking part in the series of changes and residing in the protoplasmic organism remain unchanged. Also in protoplasmic changes, the relation consequent on the change, or series of changes, is related to the antecedent relation in a manner different to that which prevails in physical changes. All physical relations are integral parts of the system of energy, and, in a sense, derivative forms of the original organization of the universe; and in all physical changes it is possible by making use of other physical changes to return, through a suitable series of transformations, from the consequent to the antecedent form of relation. Whereas the relations embodied in protoplasmic organisms, though undoubtedly forms of energy, are, in addition to being parts of the system of energy, also adjustments to it; and at the same time that they are derivative forms of the original organization of the universe, they are also expressions of the order and harmony established by means of it; furthermore, in protoplasmic changes, though the energy is conserved, the change is not one altogether in accordance with the cyclic forms of energy, but is also a change definitely related to the conservation of life, and the only way in which an approach is made to the antecedent relation is when, perchance, the products of the decay of one organism become in process of time the means of support to another and similar organism.

We must not, however, attach too much importance to these points of distinction between protoplasmic and physical relations. All changes due to protoplasmic activities, depend, equally with physical changes, on determinate mechanical conditions; and the activities of protoplasmic bodies are rigidly connected with the external stimuli, and always take place in a degree proportionate to the degree

of stimulation. The action is, therefore, so far in agreement with physical processes that on protoplasmic changes, the same antecedent relations are invariably followed under the same physical conditions by the same consequent relations. And though the reactionary power of protoplasm may manifest itself in particular lines of activity tending to the conservation of life, such as those which occur in heliotropism and geotropism, these and the other like activities are all connected with physical antecedents, and take place in accordance with fixed conditions pertaining to the physical order.

All purely protoplasmic activities are, in fact, under the rule and government of the physical order; and the plant, as specialized in its highest forms, is, from the point of view of the processes of evolution, the ultimate outcome along one line of evolution of the integrations of matter. So may we also speak of the bodily structure of animals and of the purely reflex actions of their nervous systems.

But when we pass from the physical and the protoplasmic to the psychological order of facts, we at the same time pass from that which is mechanically to that which is mentally conditioned. Mind is not matter, nor are the manifestations of mind activities of force. Matter is made up of physical relations which manifest themselves by undergoing changes of relation under the action of processes we call forces; mind contains a property of being affected by changes of relation, and is essentially a consciousness of relations. Neither is mind life, nor are the manifestations of mind vital activities. Mind and life, indeed, agree in this, that each is manifested under certain physical conditions, and both respond to stimuli in such a way as to give rise to movements tending to self-conservation. But while in the case of life *veræ causæ* for the movements of self-conservation are found in purely mechanical arrangements, in which there is a definite relation between the stimulus and the response of the organism, and whereas the movements of self-conservation on the part of life imply nothing more than that in relation to physical changes life-forms have acquired, through adaptation to the physical order, definite

and determinate means by which their structures are preserved; in the case of mind the stimuli are merely signs, marks, or tokens, and the movements of self-conservation are definitely related to states of self-feeling. In truth, the analogies between mind and life are fanciful rather than real; for to apply the term self-conservation to life is to extend the meaning of it beyond its due limits. Life-forms in their protoplasmic aspect are conserved, not self-conserved, and the conservation is in every case nothing more than a mechanical relation established by means of natural selection between the native reacting-power of the protoplasmic body and its environment. Natural selection, acting upon the variations of protoplasmic structures, is quite capable of explaining such adaptations as those by virtue of which the roots of plants seek for moisture and lines of least resistance in the soil. Also in the case of the carnivorous plants, where in Venus's fly-trap the smallest impact upon the irritable surfaces is immediately responded to, while the stimulus of a great pressure is disregarded, and where in the sundew the impact of a raindrop is unheeded, whilst the slightest stimulus in the form of a pressure finds a ready response, we need not seek to refer the difference to anything else than the reaction of the organisms to particular kinds of stimulation. The fly-trap and the sundew have each become a piece of mechanism, started by an appropriate impulse, and the difference between their respective modes of action is not more strange than that between the different methods of imparting motion to the projectiles from a cannon and a catapult. Similarly, also, we may account for the apparently purposeful acts of the lower animal organisms, such as that of swarms of medusæ seeking the light. In all these cases the reactions are connected with physical antecedents, and take place with uniform regularity under fixed conditions of occurrence, and there is no reason to suppose that they involve anything else than mechanical adaptations ordered and arranged in accordance with the demands of the physical order. The state of the case, however, is different with regard to the manifestations of mind, and the changes

of relation associated with mind. Mental manifestations follow in the train of certain physical processes, and are attended by changes of relation in the physical order; but they are in themselves distinct from anything physical, and the relations of matter established by means of them are not altogether mechanically conditioned.

In the order of mind we distinguish three forms of manifestation, feeling, knowing, and willing, which we may speak of respectively as due to the affective,<sup>1</sup> perceptive, and conative powers of mind. In all manifestations of mind these powers are present. And wherever mind is manifested, an order is manifested which belongs neither to the order of changes of relation, nor to the order which under changes conserves a particular group of relations, but which is essentially a consciousness of relations.

To illustrate: I cross a railway on one occasion by means of a level crossing, and on another occasion by means of a gangway elevated above the railroad; and in crossing I hear, on both occasions, the whistle of an approaching engine which is out of sight. On the one occasion I am affected by an emotion of alarm, and break into a run across the lines; on the other I am sensible only of a disagreeable noise, and no external actions worthy of notice follow. But in both cases the stimulus and the physical circumstances of stimulation are practically the same. The whistle of the engine on both occasions falls on my ear as waves of sound in the air; these stimulate my auditory nerve, and the nerve stimulation is passed on to appropriate ganglionic cells of my brain; and it would be a mere quibble to contend that an elevation of about fifteen feet above the ground, when on the gangway, causes any appreciable difference of intensity in the stimulus, or of variation in effect on my auditory nerve. The difference between my actions in the two cases, therefore, is not conditioned by the external circumstances of stimulation. The energy present in the waves of sound which fall on my ear is doubtlessly conserved, both when

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<sup>1</sup> For the use of this term as descriptive of the domain of feeling, see SULLY, *The Human Mind*, vol. i. part ii. chap. iv. § 2, note.

I run and when I do not; but the conservation of energy does not in general imply absolute control over the series of relations in which it is conserved—a falling body suddenly arrested may part with its energy of motion in the form of heat, or in giving motion to another body, according to the circumstances of arrest; and in the cases before us the different resultants are evidently due to internal conditions. And these internal conditions are not mechanical. Had I, when on the level crossing, been absorbed in thought, and unconscious of my surroundings, I might never have heeded the blowing of the whistle, and my body might perchance have been overtaken by the engine; and the reason why I run in this case and not when on the gangway, is that my flow of consciousness on hearing the whistle is different in the two cases. In both cases an idea of the object whistling momentarily arises in my mind; but when on the gangway my previous consciousness is such that this is immediately obliterated by my sensibility to the sound as a mere noise; while, when on the level crossing, the hearing of the whistle leads to the consciousness of the dangerous situation of my body, and I run, my running being accompanied by an emotion of alarm. All changes of relation attendant on mental manifestations are, in fact, attendant on the consciousness of relations, and not merely, as in the physical and the protoplasmic orders, on mechanical processes. The change of relation which takes place in the conversion of the waves of sound into the excitation of the nerve-fibres is carried forward on each occasion of crossing the railway, to the appropriate ganglionic centre or centres in the brain; but owing to the inhibition by my consciousness of different nerve-centres in each case, or other possible effects of the mind on the brain, its effect is there varied, and the flow of consciousness becomes different; so that when on the level-crossing I become conscious of danger and break into a run, and find afterwards, for myself, my heart to be throbbing, and others tell me my eyes express alarm, these resultant effects are not mechanically, but mentally conditioned.

It may be urged, however, that mental manifestations are merely the subjective aspect of states and operations of the



nervous system, resulting from the excitation of the ganglia; and that what we here mistake for mental control over the response, in answer to the stimulus, is simply the result of the gradual formation of nervous adaptations in the lifetime of the individual, or in the history of the race. Every mental manifestation is attended by a physical change in the brain; and without changes in the brain there can be no manifestation of mind. Is it not simpler then, it may be said, to preserve the continuity of the physical processes, and regard the manifestations of mind as merely the accompaniments of nervous changes? It admits of demonstration that feelings and emotions depend on outgoing nervous tremors as well as on sensory stimuli and the original consciousness—that, for instance, when on the level crossing, my emotion of alarm is due not only to my consciousness of danger, but also to the outgoing currents which give rise to the throbbing of the heart, and the expression of alarm in the eyes; and I may even not be fully conscious of the intensity of my alarm until I have run across the railway. But nervous tremors are not feelings. And consciousness is evidently a factor in the inhibition of the nerve cells. For, granted that, on the stimulation of the brain, the change of flow of consciousness is determined by the previous state of the brain consequent on the inhibition of certain nerve centres, this inhibition is always accompanied by consciousness, and varies with the variation of consciousness. And if we go still further back, and seek to argue that any particular consciousness is not the cause, but the accompaniment of the inhibition of nerve-centres, how are we, on any hypothesis of the bare continuity of physical processes, able to conceive that a series of changes of physical relations can, by passing into the reactions of protoplasmic tissues, introduce into itself affections with regard to itself, and combine these into the consciousness of one or more of the relations in its own series of changes of relation?

The problem of conscious thought has always stood in the way of a purely mechanical conception of things. And no hypothesis of nerve action can account for the consciousness of relations. Mental manifestations pertain, not to the order



of changes of relation, but to the order of consciousness of relations. And in all changes of relation connected with the manifestations of mind, the consequent relation is related not directly to the change of relation present in the stimulus, but to other changes of relation in the series of changes in progress, of which the change present in the stimulus furnishes merely the mark or sign. To take again the illustration of crossing the railroad by means of the level crossing. By means of the sensations supplied in the stimulation of my auditory nerve by the atmospheric waves of sound, I am conscious of a sound which I refer to the blowing of the whistle of the engine, and which is to me the occasion of the realization of other relations in the series of changes in progress—those of an engine travelling towards me, and the motion of my body across the path of the engine. It is the realization of these other relations which is the cause of the consequent change of relation in the act of running; and the impulse to run is due, not to the effect on my brain of atmospheric waves, but to the idea which arises from the sound being the mark or sign of the whistling of the approaching engine.

## § 2. *The Philosophical Views of Mind.*

That mental manifestations are the subjective side of physical processes is the view accepted in general by the philosophical school of evolutionists. The mental, however, is not regarded as dependent on the physical. The mental and the physical are asserted to be different faces of the same thing. But precisely the same reason, which prevented us from discussing in full the views of this school respecting the protoplasmic evolution, prevents us from here entering minutely into their views with regard to mind. And, though it may be questioned if a prejudgment is not made with regard to the identity of the mental and the physical by reading the conditions of force into the conditions of mind, and by insinuating through a lax terminology the constitution of the physical order of things into the constitution of the mental, we cannot now discuss their views otherwise than as an attempt is made to

show from the *a posteriori* side that they are in agreement with the facts of the order of evolution.

The philosophical evolutionists are wedded to the principle of the persistence of force; and it is necessary to their views of mind that a mental element should come directly into touch with the changes of relation by which the mind is affected. Consequently, they refer all nerve processes to the immediate operation of force, and assume all nervous activity to share in mental or sub-mental attributes. Thus, they speak of mind and nervous action as "the subjective and objective faces of the same thing"; and assert that states of consciousness are produced by the differential grouping or compounding of psychical states which are beneath consciousness. For consciousness to exist, they say, it is necessary that a given psychical state should be followed by a different state; and a cognizable state of consciousness, they explain, is attended by the transmission of a number of little waves from one nerve cell to another; so that the ultimate psychical elements of each conscious state correspond to the passage of these little waves one by one, and the ultimate unit of mind is a simple psychical shock answering to a single physical pulsation. And they support these views with the argument that as the loudness of a musical sound corresponds to the amplitude of the atmospheric waves of sound, if there were not some psychical modification corresponding to each increment of intensity in the wave, there would be no state of consciousness answering to the total rise from the minimum to the maximum.

But the mental order is in direct correspondence, not to the order of physical change, but to this order as represented in nervous changes. The physical forces act on protoplasmic structures merely as releasing agents; and the reactions of nerve tissue, as of all other protoplasmic tissues, are in correspondence to the adaptations of the life-form in which they occur, that is to such elements only of physical change as are of advantage to life, and not to physical changes in general. The mental order and the physical order can, therefore, only be different faces of the same thing, if it be shown that the adaptations of nerve tissue are in immediate relation with

the physical forces, and determined solely by the strictly physical conditions of the molecular waves of stimulation. Otherwise, an adjusting medium is interposed between them, and there can be no adequate foundation for the views of the philosophical school.

Accordingly, we find that Herbert Spencer, in his speculative view of the origin of nerve tissue, seeks to connect its structure directly with the circumstances of stimulation. He first imagines undifferentiated protoplasm, exposed to the action of different forces in different parts, to become more frequently stimulated in parts exposed to particular forces; next he conceives a polar arrangement to originate in the protoplasmic molecules lying in the path of the waves of stimulation, so that they offer less and less resistance to the flow of the waves; and finally he supposes that nerve tissue became differentiated from the primitive protoplasmic structure by the frequency of passage of waves of stimulation along lines of least resistance, and that nerve cells arose from molecular disturbance, due to the crossing or confluence of nerve fibres. In other words, he takes nerve action to rigidly correspond with every element of change in the physical circumstances of stimulation, and ascribes the origin of nerve fibres and ganglia to the so-called protoplasmic law of direct adaptation.

His views are, however, in direct opposition to the teaching of embryology. We learn from embryology that the first step in the development of any animal consists in the division of the single cell of the embryo into a number of smaller cells, which arrange themselves in two groups of layers, usually placed one within the other round a central cavity. These layers, the inner of which is called the hypoblast, and the outer the epiblast, are common to the development of both vertebrates and invertebrates; and are suggestive of a common derivation from "an ancestor which had a more or less oval form, with a central digestive cavity provided with a single opening, serving both for the introduction of food and for the ejection of indigestible substances."<sup>1</sup> The epiblast may

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<sup>1</sup> Professor F. M. BALFOUR, *Nature*, vol. xxii. p. 418.

be regarded as representing the primitive skin, and the hypoblast the primitive wall of the alimentary canal; and a most significant embryological discovery is that, in addition to the epidermis or skin, the nervous system of animals is, in all but a very few doubtful cases, derived from the epiblast. Thus embryologists in general conclude that "the functions of the central nervous system, which were originally taken by the whole skin, became gradually concentrated in a special part of the skin which was, step by step, removed from the surface, and finally became a well-defined organ in the interior of the body."<sup>1</sup> And so far are they from accepting the view that nerve tissue originated in lines of least resistance to molecular waves, and that nerve cells arose from the crossing or confluence of nerve fibres, that Professor F. M. Balfour, to whose writings we are indebted for the facts here given, considered it satisfactorily made out — first, "that ganglion-cells have been evolved from simple epithelial cells of the epidermis;" second, "that primitive nerves were outgrowths of the original ganglion cells"; and third, "that the nerves of the higher forms [of life] are formed as outgrowths of the central nervous system." These positions, with others of a more debatable character, he illustrates from the nervous system of the common sea-anemone, which may be taken as illustrative of the evolution of primitive nervous organizations. This nervous system, he tells us, "consists of a network of protoplasmic fibres, continuous on the one hand with sense-cells in the epithelium, and on the other with muscular cells"; and, in the network of fibres, cells are present of the same character "as the multi-polar ganglionic cells in the nervous system of the vertebrates." These cells, he says, "are obviously epithelial cells in the act of becoming nerve cells," and he further regards it as probable "that the nervous network took its origin from the processes of the sense-cells," the manner being that "the processes of the different cells probably first met, and then fused together, and, becoming more arborescent, finally gave rise to a complicated network."

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<sup>1</sup> Professor F. M. BALFOUR, *Nature*, vol. xxii. p. 419.

We may also mention that Dr. Romanes, from the evidence afforded by his investigations of the nervous system of the medusæ, categorically denies that nerve tissue can have originated as Spencer supposes. He is inclined, however, to admit that the effects of use apply to the increase of capacity of nerve tissue when once it has arisen—a concession on which we need not further comment, than to say that it can only be understood as applying to the improvement of the capacity of the individual in lines of adaptation already established, and not to the facts of heredity.

The facts of the evolution order, therefore, are sufficient to demonstrate that the nervous system is to be distinguished both in its nature and origin from the material organizations which are the direct resultants of the action of the physical forces, and consequently that there is not that direct correspondence between the mental and the physical orders to justify us in concluding them to be different faces of the same thing.

There are undoubtedly, however, suggestive points of contact and analogies between the order of mental manifestations and the order of physical phenomena. The faculty of mind for receiving impressions is directly connected with the changes of relation present in the stimulation of the nerves; and the unification of impressions in the act of thought has an analogue in the persistence of the original organization of the universe, through which changes of relation are unified into the system of relations which are the objects of thought. Also the dependence of our volitions upon the ideas present to consciousness is suggestively parallel to the dependence of changes of relation on the established relations of the evolution order. Furthermore, if, as some philosophers maintain, sensibility be separable from self-consciousness and a property of nerve tissue in general, the unification of sensibility in the sphere of the imagination is brought into close connection with the empirical laws of association impressed by the physical order on the excitability of the ganglion cells.

And here we stumble across another philosophical question



on which a few words must be said. Many difficulties with regard to mind would be removed if we could separate sensibility from mind, and accept the view that while the lower animals possess the faculty of receiving impressions, they are without the knowing or perceptive faculty. The view itself finds favour with some philosophers of the school of Kant, as enabling them to avoid the difficulty of regarding the lower animals as sharing in the self-conscious principle. And its truth would make little difference to our argument. It would merely entail the shifting forward to a later stage of evolution the line which separates the mental from the physical. But the facts of the case are, we think, decidedly opposed to the view. The exercise of choice on the part of the lower animals, and the fact that animals learn from experience, appear to be conclusive with regard to their possession of mind; and it is difficult to conceive that their cries of pain are unaccompanied by the consciousness of pain. As accepted by the school of Kant, the view relies for its chief support on the distinction which Kant makes between the synthesis of the understanding and that which occurs in mere sensibility. And Professor Green, taking the case of a burnt dog dreading the fire, suggests that this may be due to the sensation of the fire awakening an imagination of the pain, imagination in its reproductive form belonging, according to Kant, exclusively to sensibility, and so subject only to the empirical laws of association.<sup>1</sup> But Kant also speaks of sensibility and understanding as probably springing from a common, but to us unknown root. And sensibility as we know it, or can know it, is sensibility that pertains to self-consciousness. We, no doubt, frequently lose ourselves in the content of a sensation. But we only know of such states as they occur in beings capable of self-feeling. And just as in no case of feeling, knowing, or willing, are we able to separate out the mental manifestation as belonging exclusively to the affective, perceptive, or conative power, but must regard every act of mind as involving all three

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<sup>1</sup> See KANT, "Critique of Pure Reason," *Transcendental Logic*, ii. § 20.

root-properties, so with regard to the lower animals, granted that their mental manifestations never extend beyond the domain of feeling and sense impressions, this cannot be taken to imply that the perceptive and volitional powers are absent.

And here we must leave the discussion of the philosophical views of mind. We shall in an appendix, however, seek to justify from the philosophical standpoint the position we have assumed with regard to them. For the present we content ourselves with premising that, so far as science has a voice in the matter, the manifestations of mind cannot be regarded otherwise than as lying outside of the system of changes of relation, and as pertaining to a new and third order of evolution which, in its lowest manifestations more or less obscure, advances, parallel with the ascending scale of animal life, through pleasures and pains, instincts and orders of intelligence, to the perfected intelligence of man.

Mind is, however, manifested only in connection with changes of relation; and its definite relations to the order of changing relations demand our careful attention.

### § 3. *The Nervous System as the Organ of Mind.*

The lowest form of a complete nervous organization, as met with in various species of medusæ, consists essentially of a number of detached ganglia imbedded in a nervous plexus. But in all higher forms of organization the ganglia are in direct connection with each other; and the nervous plexus is differentiated into nerve filaments proceeding to and from the ganglia—the afferent nerves conveying stimuli, and the efferent carrying off impulses to the motor regions. And corresponding to the bilateral symmetry of animal bodies in general, we have an arrangement of the ganglionic cells with their filaments in pairs, one in each half of the body; so that a double nervous system prevails, in which the corresponding ganglia are connected by fibres called commissural fibres. In the lower molluses, this arrangement of ganglia remains distinct; and, roughly, the distinction begins to be bridged over when we pass from the vegetative to the locomotive order of animals, and arrive at animals which possess a brain.

Further, only in ascending to the vertebrates do we find the ganglia approaching each other so as to coalesce together in the spinal cord and brain. And with this coalescence we notice that in all vertebrates the nervous system consists of the spinal cord, the medulla oblongata, the cerebellum, the so-called sensory ganglia, and the cerebrum; and that the cerebral lobes and the cerebellum increase in size and complexity as we pass from fishes to reptiles, from reptiles to birds, and from birds to mammals. Finally we arrive at the nervous system of man, to which, in elucidating the manner in which nerve tissue is connected with the manifestations of mind, we shall for the most part confine our attention.

In the nervous system of man the spinal cord is lodged in the canal formed by the vertebræ, and extends from the middle of the origin of the lowest rib to the base of the skull; the medulla oblongata is, to all appearances, a continuation of the spinal cord within the head; the cerebellum is situated above and behind the medulla oblongata; the sensory ganglia are arranged in pairs along the base of the skull, and from parts only of the optic thalamus, which, with its complement, the corpus striatum, occupies the central region of each hemisphere of the brain; and the cerebrum, consisting of large lobes of folded convoluted nervous substance, is superimposed on all the other nervous centres of the skull, so that, when looked at from above, it apparently covers the whole of them. And to each of these distinct parts of the human brain special duties have, in the course of its evolution, been assigned. In the spinal cord, the various ganglia act either as true nerve centres, which receive and respond to stimuli, or together form an "internuntiant cord of communication between its own nerves and those of the higher nervous centres." The medulla oblongata is specially connected with the actions of swallowing and breathing, and combining the muscular actions necessary for speech. The cerebellum probably serves "to discharge or give off molecular energy for the initiation of muscular movements";<sup>1</sup> and "to co-ordinate movements guided by

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<sup>1</sup> BASTIAN: *The Brain*, p. 510.

vision, or combine the general movements of the body, rendered necessary by special actions ordered by volitions.”<sup>1</sup> The optic thalamus receives, transforms, and directs to appropriate parts of the cerebral lobes the impressions received from without; and this organ, we may further mention, consists of two parts, one part being made up of four ganglia, which are foci respectively of olfactory, optic, sensitive, and acoustic impressions, and the other consisting of a central region of grey matter, which is continuous with the central grey matter of the spinal cord, and which forms the means of communication by which impressions from the vegetative life of the body reach the cerebrum. The corpus striatum receives and combines the activities proceeding from the cerebrum, the cerebellum, and the spinal cord, and projects them into the different channels whence they find outward expression. Finally, the cerebral lobes are, in all probability, the true seat of sentient life, and present for the manifestations of mind an extended and intricate surface by means of their fissures, lobes, and convolutions. And in the action of the brain of man a stimulus received by a sensory nerve is first conveyed to the proper quarter of the optic thalamus, and from thence radiated to a specialized part of the convoluted lobes of the cerebrum. There it dies away, and the peculiar excitability of the cerebral cell is aroused, and gives occasion to an impression on the mind; then, the mind having taken cognizance of the disturbance, an appropriate response is made, and directed downwards to the corpus striatum, to manifest itself as an outward act.

Further, corresponding to the specialization of function in the various parts of the nervous system of man, we have probably definite stages of evolution, and it is probable that, in the course of evolution, the same division of labour and extension of exercise has taken place with regard to the duties performed by the ganglia as we have observed to take place generally with regard to the functions of the protoplasmic cell. In the lowest nervous systems, such as those possessed by the

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<sup>1</sup> BASTIAN : *The Brain*, p. 568.

medusæ, each ganglion performs all the duties required. But in the nervous system of the echinodermata, it is observed that a star-fish is able to co-ordinate the movements of the tube feet of its rays much better under the action of two or more ganglia than of one. And in the nervous system of the lower mollusca, while the sensorial excitations of light and touch are conveyed equally to both anterior and posterior ganglia, there exists a division of labour, so that the anterior are concerned chiefly with the control of the animal functions, and the posterior with the movements of the body. Further, this division of labour becomes the more pronounced as the nervous organization increases in complexity, and new duties are performed, and it is probable that in the vertebrates the specialization of ganglionic centres has advanced to such a degree, that each group of centres performs the same specific duty as in man. The special structure of the cerebral lobes appears, and many indications point to it as the peculiar seat of the mental life. Consciousness becomes isolated, in all probability, into the special region of the cerebral lobes, and with few exceptions, such as the beaver, the mental life is the more vigorous and varied as the surface of the cerebral convolutions is the more intricate and complex.<sup>1</sup>

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<sup>1</sup> It is very noteworthy in this connection that nervous activity in general begins with surface differentiation of cells. Nerve cells took their origin from pigment, or other modified epithelial cells, and disappearing into the body, continued their functions, and underwent further modification as the nervous organization increased in complexity; but always so, that their special excitability may be assumed to have resided in layers of cells on the surface of the brain.

And would it be fanciful to speculate upon this, and say that the peculiar excitability of the nerve-cell is connected, not with atomic matter, nor with the motions of such matter, but with the peripheral connections between atomic matter and the matter of space; so that in the third order of evolution we have on the physical side the evolution of such peripheral connections, as in the prior two we have in the first the evolutions of the relations of atomic matter in a static condition, and in the second the evolution, depending upon a complex and varying molecular constitution, of the relations of such matter possessing dynamic properties?



*§ 4. The Physical Side of the Mental Life.*

The degree of mental life is, in general, intimately connected with the extent of surface of the cerebrum. And that there is a physical side to the mental life is evident, not only by inference from the growth in complexity of the brain, but also from the general structure of the nervous tissue as seen in man. Each nerve which proceeds to a ganglion is made up of a multitude of fibres, which never unite with each other, but run without a break from the sense-organ to the ganglion. In the optic nerve, for instance, there are probably not less than one hundred thousand nerve-fibres. And the number of different sensations which can be received through the medium of any sense may possibly correspond to the number of fibres which proceed from the organ of sense. Also—though recent investigations have thrown doubt upon the opinion that each nerve-fibre has its own peculiar office in conveying a special stimulus, and it is more probably true that nerves are functionally indifferent to the kind of stimulation they transmit—it is probable that special fibres, which have once been appropriated by use to convey to the brain a particular stimulus, continue to select that impression always. It is, at any rate, fairly established that our different sensations of colour depend upon numerous distinct nerve-fibres.

Further, there is a definite change in the sensation corresponding to definite changes in the stimulus applied. Heat is, in general, more agreeable than cold, and there is a uniform accession of pleasurable feeling from heat as the temperature rises up to the neutral point, after which heat becomes painful. Also, every stimulus of a sense-organ must reach a certain intensity before a sensation becomes appreciable; and Weber's law, which, however, is only approximately true, states that when this intensity has been passed, the sensation experienced increases in arithmetical progression as the stimulus increases in geometrical progression, until the height of sensibility is reached, when there is no longer a discrimination of the increase of the stimulus. Moreover, nerve-fibres and ganglia, on being stimulated, undergo change, and their further capacity

to exert their functions becomes weakened ; and accompanying this physical fact, we observe that the first action of a stimulus is attended by the most vivid consciousness.

The brain is also preserved in vigour by the same conditions of blood-supply as the other organs of the body, and its general states are regulated by conditions similar to those which prevail with regard to other protoplasmic tissues. And connected with the vital conditions of the brain, we notice that alcohol and the reception of unexpected good news are attended by similar mental effects ; so are also a blow on the head, and the announcement of a terrible calamity. We notice, further, the curious contrast that, while in liver complaint the patient suffers from mental dejection, in consumption he is fortified by mental elevation.

Even consciousness occurs only under certain physical conditions. Reflex actions are not accompanied by consciousness, even though the complexity of the nervous system be very considerable. For the origination of consciousness a period of latency is absolutely necessary, and the latent period is that to which consciousness is confined. And the reason assigned for this is that, as the stimuli to be responded to become more complex and varied, the special nervous organization assigned to meet the exigencies of the case is unable to carry on the operation, and there is a certain play or arrest of the action until an appropriate responsive movement has taken place. This arrest marks the reign of consciousness, and consciousness continues with the repetition of the stimuli until the line of discharge becomes so well traversed that there is no arrest of the action, and the act has become automatic or reflex in character. And this may be applied in explanation of many habitual actions, such as reading and writing, which when first acquired demanded the conscious effort of the mind ; and possibly many actions which were attended by consciousness in our ancestry, and which are attended by consciousness in the lower animals, have become so organised by the development of the brain as to become, in man, purely reflex actions. It is even possible that the cerebral hemispheres have for their function that of dealing with stimuli which have not had

reflex mechanisms set apart for them, and that the consequent perturbation therein is the immediate cause of the manifestations of mind.<sup>1</sup>

Again, if we analyse what takes place in mental acts, we find that there are three phases of mental activity, each of which is probably accompanied by physical processes in the brain.<sup>2</sup> There is first the phase when the mind awakes to the impression, and the act of attention occurs; second, an intermediate phase while the judgment is being effected; and third, the final phase in which the mind is variously affected by the character of its judgments. And in the physical accompaniments, we notice that, with regard to the first phase, the impressions are probably received on the smaller cells of grey matter that lie at the surface of the cerebral hemispheres; that heat is evolved, and waste of substance occurs, as the mind becomes attentive; and that attention wearies with the exhaustion of the cell. And with regard to the second, we observe that beneath the small cells of grey matter are sub-adjacent zones of larger cells continuous with them, and these possibly are connected with the intellectual phase, after the attention has been aroused; and, supporting this, we have the observation of how purely automatic many of the accompaniments of the intellectual operations are, and how, without our knowledge, certain ideas are presented, and trains of reminiscences evoked. Lastly, with regard to the third phase, we find that, accompanying emotions and probably associated with them, various disturbances pass outwards into the sympathetic and motor regions of the nervous system; that the circulation of the blood and the digestion are affected by painful emotions, and that the various muscles of the body respond to and give indications of the whole range of emotional activities.

Memory also is closely allied to the nervous structure of the

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<sup>1</sup> And we may note that it may not be altogether a speculative view, that self-consciousness is continuous in man only from the second or third year of life, simply because the infant mind is concerned with co-ordinations of the mental to the physical, the characteristic of which is that they pass over into reflex actions, in which no element survives to awake a conscious memory in after life.

<sup>2</sup> J. LUVS, *The Brain and its Functions*, pp. 212-231.

brain. The imagination of a bright colour fatigues the optic nerve; and the range of memory is possibly proportionate to the nerve-elements in which impressions can be stored. Even abstract qualities are associated with sensorial impressions. Happiness is allied to the general sensitiveness of the body; beauty and satisfaction to the sense of sight; delight, mirth, sorrow, and tenderness to the sense of hearing; good and evil to the sense of taste. And it has often been remarked that memories and comparisons are peculiarly suggested by the sense of smell.

In fact, we take no objection to the view that the manifestations of mind are strictly correlated to the nervous organization, which has been built up during the course of psychological evolution. To realize relations there must be adaptation to the sphere in which relations exist; and in carrying on the operations of thought there may possibly be a physical medium associated with the conceptive faculty. We may even go so far as to allow that personality itself may possibly have a physical accompaniment in the intimate connection between the cells of the brain.

### § 5. *The Inner Side of the Mental Life.*

But the relativity of mental manifestations to the physical processes of the brain is not exhaustive of the subject of mind. In looking at the physical side of mental manifestations, we take account only of the external factor which gives to mind the means and modes of its manifestations, and leave unconsidered the internal characteristics of these manifestations. The mechanism through which mind manifests itself is explained rather than mind itself; and, however far we trace the connection between physical processes and mental manifestations, we never arrive at anything contradictory of the fact that consciousness and its attendant manifestations are something distinct from the changes in the brain. It is perfectly true that the manifestations of mind are conditioned by the physical organization of the nervous system; but it is equally true that something is involved in feeling, thought, and volition, which underlies this organization, and

is distinguishable from anything physical. The materialist explains by the physical processes of the brain the accompaniments of mental manifestations; he does not, and cannot, explain the manifestations themselves.

It is not necessary, however, that we should here do more than touch upon the most salient point and content ourselves, for the most part, with the recapitulation of what has been already said. All physical processes are changes of relation in molecules, or masses of matter, from one form of relation to another; and though the protoplasmic changes in the brain are not in strict physical continuity with external changes, but are rather adjustments to them, they nevertheless pertain to the same order of change, and under no conditions can they of themselves give rise to the discrimination of change. Mr. G. H. Lewes certainly defines discrimination to be "relative intensity, the momentary predominance of one thrill over all the simultaneous thrills to which the sentient organism is subject."<sup>1</sup> But this view, in which we notice that physical terms are applied to mental facts, can only give countenance to the physical hypothesis, if thrills be changes of relation of which the dominant member rises to the consciousness that it is a change related to other changes.

No metaphorical usage of words ought to be allowed to obscure our vision of the essential distinction between mental manifestations and physical processes. In mental manifestations there is not a change from one form of relation to another, nor is there the conservation under changes of a particular group of relations. Mental manifestations pertain to the order of consciousness of relations; and between the order of change of relations and the order of consciousness of relations there is a gulf fixed which no metaphor can bridge.

—We have no right to include mental manifestations under the physical phenomena associated with them. It is certainly true that the brain is the organ of mind; but this proves nothing more than that the functions of the brain are of an

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<sup>1</sup> *Problems of Life and Mind*, Problem II. § 151.



executive order; and for the manifestations of mind to be brought in any way under the dominion of physical processes it must be further shown that the brain is authoritative, and that mental manifestations attend its action only as the foam rides on the crest of the broken wave. But the functions of the brain are functions pertaining to the order of change, and every change that takes place in it is a change of relation that passes over into other changes of relation; and, though the excitation of a cell is known to leave a more or less permanent modification behind it, such a modification is essentially a part of the changes of relation that take place: we may conceive the next excitation to be therefore modified—as when an anvil is repeatedly struck by a hammer, a rise of heat takes place with every stroke—but we are utterly unable to form any conception of such modifications, or their combinations, informing us with the consciousness of a relation. The changes of the brain do not constitute mind; and mental manifestations are something more than mere attendants on physical changes.

§ 6. *The Evolution of the Manifestations of Mind in relation to the Inheritance of the Nervous System.*

We have seen that there are two sides to the mental life—a physical and an inner side—that from the physical side the excitation of protoplasmic elements in the nervous system give the occasion for the manifestation of mind, and that from the inner side mental manifestations pertain to the order of consciousness of relations. We must now, however, turn our attention to the fact that the protoplasmic elements of the nervous system in no way differ from other protoplasmic structures in respect of variability and inheritance, and seek to determine how the evolution of the nervous system, under the processes of variation and heredity, is related to the evolution of the manifestations of mind.

Nerve-cells and their filaments possess a functional activity, which is exercised in conveying stimuli, receiving them and responding to them, and mental manifestations arise and

persist in that part of the action where the stimuli are received and responded to. But further than this from the physical side we cannot go. Nor can we, without overstepping the limits of scientific thought, here discuss in full the evolutionary aspect of the root-manifestations of mind.

We premise, however, that experience, with all that is implied in the term, cannot be regarded as a product of evolution. We know that the widening sphere of the manifestations of mind is associated with the growth and development of the brain, but this gives us the condition, not of the making, but of the extension of experience, and to conclude that experience is a product of evolution we must have evidence that experience is made. And no such evidence is obtainable. The lowest forms of nervous organization present us with no indications that the animal has experiences, but neither are there indications that the animal possesses a mind. Indeed, our only test of mind in animal life resides in the proof that the animal has experiences. And if it be said that the root-property of mind is, nevertheless, present in all nerve ganglia, as a sensibility to physical processes, we cannot tell whether this is so or not; nor can the animal itself know whether it has sensations, for a state of sensibility to be known as such involves experience.

But let us suppose that experience is made. Let us imagine that the only root-property of mind is that of an uninformed sensibility attendant upon a stimulus. It follows that in the building up of experience there must be involved on the mental side nothing more than states of sensibility arising from physical changes of relation. But experience, over and above the state of sensibility, contains both a reference to a definite relation, of which sensations are the sign, and also a reference to the fact that this relation is related to other relations. If, then, there be no operation of mind except what is contained in the mere state of sensibility to a change of relation, whence do we derive the factors determining the relation, and the judgment that it is a related relation? Not immediately from the external physical order. For that which defines a physical relation, and the relations of physical relations,

is not a change of relation, but the order of evolution, as expressed in the law of the distribution of energy and the persistence of the original organization of the universe. Nor can we ascribe the making of experience to natural selection acting in accordance with the physical order. For natural selection is not creative, but selective; and, assuming sensibility to be the only root-property of mind, the consciousness of a relation must have arisen as a variation of sensibility before it could have been selected. It is impossible that the consciousness of a relation can have been a variation of an affection by a change of relation. And as experience, regarded in its relationship to the physical order, implies not only that the mind is affected by changes of relation, but also that it takes cognizance of relations present in the order of changes, this can only be under the condition that the mind possess some further root-property than that of a mere sensibility to changes of relation.

That every cell-stimulation of the brain passes over into a responsive action of the cell must be fully admitted. But somewhere in the line of evolution of nervous processes, automatic action must have yielded place to the pure operation of mind. It may be that not until a certain basis of reflex action has been set up, can the distinctive activity of mind arise as a discriminative and ordering power; and it may be precisely when a molecular change in a nerve-cell is suspended, because of the absence of an appropriate channel of discharge, that the mind is called into exercise to realize the relations present in the change, and direct the line of discharge. Somewhere, at any rate, mind must have come in. For had the external stimuli, which come into relation with the nervous organization, always passed over, without the direction of the mind, into channels of discharge newly excavated for themselves, or worn by previous discharges, or if, coming together or in immediate sequence, the occurrence of one had revived changes connected with the other, we fail to see any reason at all why consciousness should ever have accompanied the work of the nervous organization, or why feeling, thought, and volition should have attended the course of evolution. Mental

manifestations have their place in the order of evolution; and their gradual rise from lower to higher degrees of manifestation is sufficient to prove that they have some function in the economy of Nature.

The root-manifestations of mind we distinguish as feeling, thought, and volition. And *pari passu* with the ascending scale of animal development, these root-manifestations gradually extend themselves in range and power. Corresponding to the lower stages of animal development, pleasures and pains were probably the earliest forms of mental manifestations; and there undoubtedly existed at a very early stage a complete differentiation of the modes of sensibility into the various modes corresponding to the five organs of sense. We then mark a gradually ascending scale of manifestations, of which the intellectual stages are memory, imagination, instincts, rudimentary reasoning powers, and abstract thought; the emotional stages, fear, parental affection, jealousy, sympathy, the self-regarding emotions, and the social emotions; and the volitional stages, a progress from the direct incentive of the feelings to the power of voluntary attention, and finally to self-conscious adaptation.

And we may take the views expressed with regard to the evolution of memory, as a test case of how far physical conditions may be taken as operative in the evolution of the mental life. Dr. Romanes conjectures memory to have arisen initially in the feeling of after-effects, such as the after-pain of a blow; and to have had for its next stage the feeling that a present sensation was like a past one, such as that of "the sweet taste of milk being remembered by newly-born infants." And these stages he connects with the physical fact that when a nervous discharge takes place in a ganglion, it leaves behind it a molecular change which is more or less permanent, and which renders a discharge in the same route afterwards more easy.<sup>1</sup> He also suggests that in the advance of memory to the association of ideas, when two sensations having occurred together or in immediate sequence, the recurrence of the one

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<sup>1</sup> *Mental Evolution in Animals*, pp. 35 and 114.

is accompanied by the revival of the idea of the other, there is a substantial agreement with physical processes.

But in this hypothesis it is evident that we have an explanation offered only with regard to that side of memory which depends on the affective property of mind; and only on the supposition that mind in the lower animals is made up solely of states of sensibility, can we regard the explanation as in any degree satisfactory. But if states of sensibility were all that obtain in the minds of animals, they could feel no pain, and remember no sensation. We are conscious not of states of sensibility, but of experiences; and to feel pain at all, or remember a past sensation, there must be an act of mind, involving more than a mere sensibility to physical impressions. We have no desire, however, to deny that physical associations are necessary for the existence of memory. And so far as physical conditions are necessary to the evolution of wider ranges of experience, so far must physical conditions prevail in the evolution of all mental manifestations. But over and above the physical conditions necessary to the evolution of mind, there must always remain the conditions supplied by mind itself; and memory, so far as it involves a reference to conscious experiences, is so far removed from the physical conditions of evolution.<sup>1</sup>

The brain, however, is necessary to every manifestation of mind. And the nervous organization inherited from our ancestors goes far to the determination of the character of our manifestations of mind. We inherit a nervous organization

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<sup>1</sup> That Dr. Romanes' views are not to be taken as supporting the physical hypothesis, is evidenced by the following extract from an article in the *Nineteenth Century* of December, 1882, where, commenting on the view that "consciousness would appear to be related to the mechanism of the body simply as a collateral product of its working, and to be completely without any power of modifying that working, as the steam whistle, which accompanies the work of a locomotive engine, is without influence on its machinery," he says such a view "is opposed to common sense, because we all feel it is practically impossible to believe that the world would now have been exactly what it is, even if consciousness, thought, and volition had never appeared upon the scene—that railway trains would have been running, filled with mindless passengers, or that telephones would have been invented by brains that could not think, to speak to ears that could not hear."



so adapted to external conditions, that our general sensibilities of comfort and discomfort, with regard to the functions of animal life, are already determined for us. We also inherit nerve-elements adapted to the special sensibilities of the senses; and the agreeable and disagreeable as associated with taste and smell, the perception of light and heavy weights, warm and cold temperatures, loud and soft tones, light and dark shades, bright and sombre tints, are all in their first degrees of discrimination instinctive in the young. Probably, also, we inherit nerve-elements associated with distinctive feelings, thoughts, and volitions; we have instinctive manifestations of pleasure and pain, fear, anger, and sympathy, in the domain of the feelings; instinctive co-ordinations of the senses of touch and sight, yielding the ideas of direction, form, size, distance, and movement in the exercise of the intellect; and instinctive actions in the adjustments of the eye, the motions of the limbs, and the grasping at objects in the operations of the will. Indeed, as man inherits all congenital ancestral adaptations, and as all the root-manifestations of mind, feeling thought and volition, were present in our animal ancestors, so must we have inherited the nervous organization necessary to these manifestations, and also the definite tendencies which the organization possesses, and which develop themselves in the child who learns by individual experience to interpret them.

But we must be careful that we take a correct view of the connection between the inheritance of the nervous system and the evolution of the manifestations of mind. We may agree with the psychologists of the physical school when they say: "Because the organism, and in particular the nervous system, is transmissible, therefore the various modes of sensation, instinct, imagination, intellect, sentiment, are also transmissible."<sup>1</sup> But we cannot pass unquestioned their statement "That mental evolution depends on cerebral evolution, and consequently that psychological heredity depends on physiological."<sup>2</sup>

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<sup>1</sup> Th. RIBOT, *Heredity*, p. 276 (English translation).

<sup>2</sup> *Ibid.* p. 274.

Heredity is a biological and not a psychological fact. Nerve elements, and not mental manifestations, are inherited. And all that can be meant by the term psychological heredity is that, given a certain nervous organization, certain mental manifestations occur. In this sense, and in this sense only, can we speak of a psychological heredity, and it is so far from being demonstrable that mental evolution depends on cerebral evolution, that it is not difficult to show that variations in nerve-elements must have been seized upon by natural selection, not adventitiously, but because of their association with advantageous mental manifestations, and that therefore cerebral evolution, however determinative of the mental evolution, has itself depended upon mind as a condition of its process. Further, it pertains to the functional activity of nerve ganglia that a response must be made to a stimulus; but the mind adds to the functional activity of the ganglia the teaching of its own experiences; and, as apart from mind there can be no experience, wherever experience is an element in inherited nervous processes, there is involved on the part of mind a direct determination of the cerebral evolution. How this occurs in evolution depends, of course, upon the conditions of evolution. If acquired characters be inherited, which is more than doubtful, the explanation is easy that we inherit the experiences of our ancestors by inheriting the acquired physical modifications of their nervous system; but if acquired characters be not inherited, we must suppose that precisely to the same degree that particular experiences were of service to an animal, the influence of natural selection was directed towards the selection of those variations of nerve-elements which gave occasion for the manifestation of these experiences.

Indeed, the influence of mind on the protoplasmic evolution has probably been operative to a degree not generally recognized. The human hand has been frequently commented upon as singularly adapted to perform many functions in aid of the mind; but from the evolution point of view it is no more than a sober and exact statement of fact to say that the hand, together with the foot, and the upright position of man, is mainly the creation of the mind. Our semi-human progenitors

were arboreal in their habits, of a stooping form, with hands and feet capable of grasping the branches of trees; and, as man is distinguished from all other animals as the tool-bearing animal, their intellect was probably sufficiently developed to discern the use of tools, such as a stick or a stone for purposes of attack or defence. A tool is to the animal that uses it an adaptation, in addition to its bodily adaptations, of the greatest service in life; and the intelligence to discern the utility and make use of a tool would certainly be favoured by natural selection. Then as under the direction of an increasing mental development tools came into use, great advantage must have been given to variations in the fore-limbs which gave increased ability to handle a stick or hold a stone, and to variations in the hind-limbs and the vertebral column which gave greater stability to the body when the hands were in use, or more support when burdens were carried. It is thus not improbable that the position of mind in evolution has been the chief factor in differentiating the body and brain of man from those of the animals most nearly related to him. And it may well be that the great divergency between the brain of the civilized man and that of the savage is due to no other cause than that the former has been continuously under the spur of mental exercise.

Mind is manifestly of service to animal life; and as it became more and more essential to an animal, natural selection would of necessity be directed to the fixing of such protoplasmic variations of the nervous system as were favourable to its higher manifestation. And the course of the evolution of the manifestations of mind has probably been that if a greater range of feeling or perception was of advantage to an organism, variations in nerve elements, which brought in their train wider ranges of feeling or increased means of communication with the external world, were seized upon by natural selection and made hereditary; and that if it were of advantage for mental acts to be more readily and easily performed, variations in nerve structure which gave scope for this were similarly seized upon. And thus though the psychological heredity takes place through the physiological heredity,

the character of the cerebral evolution is in a great measure, if not wholly, determined by the utility of mental endowments.

Also, we must take heed to the fact that though the experiences of our ancestors, which were of general utility in the battle of life, live in the nervous organization we inherit, and though our pleasures and pains and desires are such as the mind in the course of evolution has learned to feel, it is only by its own volition, exercised in accordance with the feelings of pleasure and pain and the emotion of desire, that mind is realized in each individual and brought into accordance with its position in evolution. We see this manifested in the play element of life, where the pleasurable activity of mind is essential to an animal for the co-ordination of the mind with the body. And in the higher mental evolution of man, all mental effort is accompanied by desire. The strangeness of a new perception fills the mind with a painful emotion, which continues until the mind has become familiar with it and attached it to its store of experiences. And in the recall of ideas under the process of constructive imagination the mind is governed only by its own pleasurable activity and desires, and combines and re-combines until it has arrived at the element which links together the relations which the ideas represent.

We cannot assume that mind itself is inherited. Mental life, as it prevails in animal life, is dependent on two factors—a nervous system, and experience of relations. The former is physical; the latter is the peculiar characteristic of mind; and the only sense in which mind can be said to be inherited is that there is inherited through the nervous organization a series of adaptations which make possible wider experiences of relations; such as the adaptations of the optic nerve to the relations of light, and the cerebral complexes to the physical accompaniments of the higher operations of thought.

§ 7. *The Further Evolution of the Manifestations of Mind  
by means of the Social Bond.*

Through the medium of the brain the mind exercises itself in the perception of relations. And experiences, at first

limited to pleasures and pains, became on the attachment of stimuli to organs of sense, extended to the various orders of experience corresponding to the senses. The senses gave the diverse channels through which relations were perceived; and as the necessity of finer discrimination arose, the volitional power of mind was called into exercise to aid the purely perceptive power. The act of voluntary attention began; and, by the cultivation of the attention, the perceptions by means of the senses were made the more determinate.

Mental manifestations, however, have not stopped short with perceptions by means of the senses; but have been carried forward into the region of what is known as abstract thought. And at the same time as this occurred they passed beyond the general range of inherited aptitudes, and came within the influence of factors supplied by the social bond.

Perhaps the most marked influence of the social bond on the evolution of the manifestations of mind, is that which takes place through the use of language. By means of language we recall past experiences. And by the use of the name to express a conception, the imagination is assisted in reducing to order the data of sense, and the intellect aided in carrying on the process of abstraction. The functional activities of the mind remain the same; but the sphere of its exercise is changed, and it concerns itself not with relations as directly perceived through the senses, but with the representative presentation of relations on the part of the imagination. It busies itself with the relations between relations; and through the processes of comparison, abstraction, and generalization, the abstract idea, or concept, becomes formed. The relations bound up in other relations are apprehended by the mind; and the concept is attached as a common nexus to the group of generalized relations.

And in this higher exercise of mind, imagination becomes in conjunction with the perceptive power the sphere of the pure operations of mind, wherein by the formation of new ideal combinations we body forth conceptions that lead to inventions and discoveries, and construct from analogies images of what we are unable directly to perceive.



Furthermore, the mind then enters upon a course of exercise which directly leads to self-adaptation. The imaginative faculty alone would carry us away from the real, if the mind were not attentive to the truthfulness of its conceptions. In forming concepts we endeavour to take cognizance of the material relations which subsist among relations; and that we may be assured we have arrived at these, it is required not only that our original ideas should be clear and accurate, but also that we should have objective criteria of the correspondence of our concepts to the relations conceived. And as these criteria can only be obtained by enlarging the domain of the senses and multiplying the means of perceiving relations, the mind, with the object of supplying them, proceeds to carry on by its own initiative the process of forming adaptations of the senses to the sphere of outward stimuli. And this action of the mind, while it enables us to verify our conceptions, also increases the range of our mental vision. We never by any exercise of the attention overstep the boundary defined by the senses; and for stimuli to be conveyed to the mind from orders of phenomena beyond their reach, we are dependent on mechanical appliances which are the creation of the mind itself. Thus we have the telescope and microscope as aids to vision, the telephone as an aid to hearing, and innumerable other contrivances — such as the chronometer, the thermometer, the mariner's compass, and the spectroscope — which have been invented to bring relations entirely beyond the reach of the senses within the grasp of the perceptive faculty.

This higher exercise of mind, though not absolutely dependent upon language, is yet, through the attachment of the name as a mark to the concept, developed and perfected by it. And it is perhaps in some way a tax on this advantage that with regard to the matters upon which the mind is exercised, the use of language, by the substitution of the word for the thing, has in many ways a pernicious influence upon the character of our judgments.

Furthermore, the influence of the social bond is not confined

to indirect influences such as that of language, but prevails in every sphere wherein mind is brought into contact with mind. Many of our opinions, though due in part to personal experience, are largely the result of tradition and other influences of society; and we exhibit an undoubted tendency to fall in readily with the accepted opinions of the community in which we live. Our sympathies are called out and developed by the social bond; and our mental activity is stimulated and increased by it. The intellect of one man aids that of another; the boundaries of knowledge are extended by the combined labours of all; the results are bequeathed to succeeding generations; and the successive generations of men build on; the stately edifice of knowledge arises; and the horizon of the intellect is extended towards the bounds of the universe.

#### § 8. *Mind in Relation to Evolution.*

Our mental life is thus evolved in two successive stages, first, by means of the inheritance of a nervous organization, and second, by means of factors derived from the social bond. And while mind is in itself distinct from the chain of physical changes, its manifestations depending upon the adaptations of the brain, and upon conditions prevailing in the social bond, are made the subject of a process of evolution in every respect analogous to the prior processes of evolution. Analogous to the order of the physical and protoplasmic evolutions, there occurs in the manifestations of mind a number of root-manifestations, on the basis of which the mental life is built up, and mind enters into extended relation with the universe. The physical order of evolution presents the sphere, and the protoplasmic perfects the organization, necessary for the manifestation of mind; and in an ever-ascending scale the manifestations of mind increase in range as adaptations to external stimuli are added to the brain, and mind is brought into contact with mind through the influence of the social bond.

This is the order of the psychological evolution. And it remains for us to come into view of its law. And here we note that, though mind brings with it into the universe an element altogether distinct from what obtains in the previous

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orders of evolution, the development of its manifestations is in its earlier stages associated with the protoplasmic order. Mind is developed as an aid to life; and among the factors which conspire to give advantage to species in the struggle for existence, mental endowments are not the least in importance. Presumably, therefore, the order of mind must have some relation to the protoplasmic law; and an examination of the relation of the manifestations of mind to this law is obviously the first step that must be taken in an enquiry into the law of the mental evolution.

## CHAPTER VII.

### THE MANIFESTATIONS OF MIND IN RELATION TO THE PROTOPLASMIC LAW

#### § 1. *Pleasures and Pains.*

WE cannot but consider that an animal which, when placed in unfamiliar circumstances, is able to arrive at an understanding of its position and take measures accordingly, manifests and exercises a degree of mind. We recognise, therefore, mind in the lower animals; and we may take the sense of comfort and discomfort, and the feelings of pleasure and pain, as probably the earliest of the manifestations of mind.

Pleasures and pains are intimately connected with the well-being of animal life. An animal naturally avoids actions that are painful, and courts actions that are pleasurable; and an enquiry into the manifestation of pleasures and pains shows that pleasure, as a rule, attends activities or states that are wholesome, and pains, as a rule, activities or states that are harmful to an organism. Indeed, in all animals, where the effects of an activity or state are not prolonged to a more or less distant time, no qualification of this general statement is needed, and the feeling of pleasure or pain is a true index of the benefit or harm experienced from the activity or state.

In relation to animal life, pleasures and pains are in no degree prophetic of the after effects. Nor are they guiding factors in evolution. Pleasure may prompt an action necessary to the preservation of the species; but the pleasure itself is strictly relative to the existing stage of evolution, and has no necessary effect upon its advance or decline, which is altogether under the control of natural selection. Pleasures and pains, as

phenomena of evolution, are in fact exactly on the same plane as variations in protoplasmic structures, and supply only the raw material on which natural selection works. An animal, whose conditions of life have changed, may exert a pleasurable activity advantageously circumstanced with regard to the change, or may just as probably persist in one no longer fitted to the changed conditions. Moreover initially the association of pleasures and pains with wholesome or injurious activities is probably itself an adaptation, through which, as Herbert Spencer says, in the long run those "races of beings only can have survived in which on the average, agreeable or desired feelings went along with activities conducive to the maintenance of life, while disagreeable and habitually-avoided feelings went along with the activities directly or indirectly destructive of life; and there must ever have been, other things being equal, the most numerous and long-continued survivals among races in which these adjustments of feeling to actions were the best, tending ever to bring about perfect adjustments."

But though pleasures and pains cannot be looked upon as prophetic or guiding factors, we must not assume that they have no significance in relation to the development of life. An animal through the feeling of pleasure engages in a wholesome action, or through that of pain avoids a harmful one; and though this correspondence is probably adaptative, yet so far as the pleasure or the pain governs the action of the organism we have it so far removed from the domination of mechanical stimuli. Let us illustrate this. An organism receives a stimulus that gives rise to a feeling of pain when occupying a position  $a, b$ ; and it instantly takes up a position  $h, k$  in which it is released from the presence of the stimulus. Work has been done in changing from  $a, b$  to  $h, k$ ; and no doubt this work has for its equivalent molecular changes in the organism; but we cannot say that the change of contour occasioned in the circumstances of the animal has been altogether produced by a mechanical cause. The stimulus did not of itself produce the movement; and had there been no feeling of pain there would have been no effort to escape from the harmful effects associated



with the stimulus. In so far, therefore, as the feeling of the creature influenced its change of position, the change of position must be ascribed to causes of a non-mechanical nature.

In fact, pleasures and pains, in controlling the action of an organism and securing for them advantageous changes of position, give to mind a distinct place in the economy of life. In the complex environment of even the simplest forms of animal life, circumstances must frequently have arisen in which slight changes of position were of the greatest service to life. Also, in all animal life the change of circumstances induced by change of position must have played a considerable part in the adaptation of life to the conditions of life; and the present position of life on the earth is probably to be explained not only by the assumption of protoplasmic adaptative features, but also by appropriate and advantageous changes of position under the influence of mental factors. And when we reflect that all forms of animal life which manifest movement, except the lowest, manifest also pains and pleasures, fears and sympathies, we are quite justified in concluding that the power of mind, from its first dawn, has had an important office in the economy of Nature as a factor conservative of an animal's position in life.

### § 2. *The Pleasurable Feeling of Existence.*

Pleasures and pains exert no direct influence on the future evolution of an animal. But an animal, in making for pleasure and avoiding pain, tends to bring about harmonious relations between its subjective feelings and its external circumstances. And the order of evolution is so far favourable to this tendency that scope is given to an animal so that by change of position it can in a measure secure a state of pleasurable adjustment to its conditions of life; and the tendency itself has so far prevailed that the vital energies of an animal have become inseparably allied to the subjective feeling which makes for pleasure. Mental manifestations thus come to occupy a definite position in the order of evolution. And there eventually arises associated with life a pleasurable feeling of existence,

which is of the greatest importance, both as bringing mind into direct relationship with the protoplasmic law, and also as giving to the struggle for existence in animal life a very pregnant signification.

Plants, as well as animals, struggle to exist; but the plant life of the world has been entirely moulded by the external forces acting upon it, and the survival has been racial, and not individual. In the struggle for existence of animal life, however, with the rise of the pleasurable feeling of existence there began to be opposed to external forces personal effort, and the individual became of as much importance as the race. Individuals who felt and enjoyed their lives, endeavoured to maintain them; and the effort of the individual to maintain its life must of necessity have reacted upon the welfare of the race. A disorganising factor had arisen. The individual had acquired, as it were, a tangential motion; and the race must have been in danger of disintegration into individual units. External bonds of union had lost their power; and unless some other welding factor arose to supplement them or take their place the race and the individual would perish together. And hence, in order to control the individual, and secure adaptation to the external conditions which make it of advantage for individuals to act in concert for mutual protection and the satisfaction of common needs, natural selection was perforce directed to the evolution of mental qualities; and mind, from being subsidiary to life, advanced into direct relationship with the protoplasmic law. Thus we had the evolution of the social feelings and the gregarious instinct as mental factors conservative of the union of individuals. Further, when mind had once asserted itself as a primary influence in the order of evolution, under the complex environment resulting from the presence of competing organisms, direct advantage must have been given to the mental adaptability of the individual; and the spur of want urging an animal to mental activity must have played a considerable part in the evolution of intelligence to meet particular needs. And it is not leaving the solid ground of Nature to say that, in view of the position of the individual as a feeling and thinking

unit, the struggle for existence has been the schoolmaster of mind to bring it to perfected self-consciousness.

§ 3. *The Adjusting Power of Mind in Animal Life.*

We have, so far, noticed two stages in the relation of mind to the protoplasmic law—first, that in which mind is subsidiary to life as a conservative factor of life; and second, that in which, through the pleasurable feeling of existence, it emphasizes the position of the individual, and comes to occupy a definite position in the order of evolution, and in which importance is given to the evolution of mental qualities as bonds of union between individuals. Mind, as an adjusting power, is found to be an indisputable factor in evolution. But, so far as we have seen, the adjusting power of mind is subservient to the law of natural selection, and therefore under the control of the power manifested in the physical order. Mind, however, is a consciousness of the relations of the physical order; and it is not improbable that increased consciousness of relations would, in view of the general stability of natural conditions, give to mind such an increase of adjusting power that in the higher planes of evolution the adjusting power of mind might be found to be more than that of a factor conservative of life, or of the union between individuals. That is, in the higher forms of animal life there may be laid such a foundation of mental adjustments that the further progress of life may depend more upon the judgments of the mind and the self-adaptation of the individual than on the influence of natural selection; and that, consequently, in the higher stages the character of the order of evolution may be determined by the power of mind. And that this is so in the case of man, we shall presently find to be true. But in the stages that intervene between the manifestation of mind in pleasures and pains, and its manifestation in the developed intellect of man, it is more than doubtful if the power of mind ever rises above the conservative stage. We must not forget that whatever judgments the mind may make, these are strictly relative to its range of perceptivity; and that where this is not extended enough to forecast the future, the external conditions

of evolution must in the long run prevail. And this applies in particular to the case of animal instincts.

Dr. Romanes defines and marks off instinct as a reflex action, into which there is imported the element of consciousness.<sup>1</sup> "Reflex action," he explains "is,<sup>2</sup> non-mental neuromuscular adaptation to appropriate stimuli; but instinct is this and something more; there is in it the element of mind."

But this distinction, so loosely made, is obviously open to serious misapprehension; and we are at a loss to understand how consciousness can be imported into a reflex action. All that Dr. Romanes probably means, however, is that in addition to instincts formed from reflex actions, we have also instincts formed by intelligence; and accordingly we find him in his general treatment of instincts adopting this distinction, and speaking of them as either primary or secondary. Primary instincts, he says, arise "by natural selection fixing on purposeless habits which chance to be profitable, so converting these habits into instincts without intelligence being ever concerned in the process"; and secondary instincts are formed "by habits originally intelligent becoming by repetition automatic." It is impossible, he tells us, that any animal can have kept its eggs warm with the intelligent purpose of hatching out their contents, or that, on the other hand, the instinct of game to keep at a safe distance from a gun can be otherwise than an intelligent habit which has become a permanent instinct.<sup>3</sup> In addition also to these two sources of instinct, we have instincts which spring from the modification of other instincts, and which may be formed either from intelligent or non-intelligent habits. Of these, Dr. Romanes gives a curious instance, on the authority of Dr. Rae, in the instinct of the grouse of North America, in burrowing a tunnel just below the surface of the snow.<sup>4</sup> The burrowing for the sake of

<sup>1</sup> *Mental Evolution in Animals*, p. 159.

<sup>2</sup> *Animal Intelligence*, p. 11.

<sup>3</sup> This, of course, may not be an acquired character, but the result of an advantage given to the timid and wary birds.

<sup>4</sup> *Mental Evolution in Animals*, p. 202.

protection or concealment, or both, was probably in the first place an act of intelligence; but the security the grouse thus experienced would lead natural selection to seize upon this faculty for burrowing, and give the advantage in life to the birds who made the longest tunnel, thus forming a non-intelligent instinct on the base of an intelligent one.

And from the nature and character of instincts as here set forth, it might at first sight appear that instincts which involve an element of mind are evidence of a determination of the order of evolution on the part of mind. That they indicate a wider range of mind is undoubted. But at the same time it is clear that, formed in relation to particular conditions of life, they are of immediate service to an animal only under those conditions; and that only the course of evolution and the action of natural selection can determine if they remain of advantage under other conditions.

Instincts in themselves contain no prevision of the future. And that they are relative to particular conditions of life is further shown by the fact that they are not of the fixed and immutable character which many suppose. They exist in many degrees of imperfection, and are capable of almost infinite modification. The nests made by young birds are very imperfect, and birds learn year by year to make them better.<sup>1</sup> Mistakes are made—ants have been known to store up beads for nuts, and rabbits in avoiding weasels toddle along until the weasel overtakes them. Change of conditions also affects instincts, and under changed conditions many instincts are known to disappear. Further, intelligence plays a great part in the modification of instincts, and Dr. Romanes relates many cases in which instincts are varied by the power of imitation, or by direct education on the part of parents. And finally domestication, as is well known, exercises an enormous influence in modifying and perverting instincts. And, though this plasticity of instinct appears in numerous cases to give increased scope to the office of intelligence, we must not overlook that plasticity is not a formative power, but

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<sup>1</sup> *Nature*, vol. xxxi. p. 533.



rather as dough in the hands of natural selection, which moulds and uses it as the varying conditions of life demand.

And on the whole we see no reason to doubt that in relation to evolution, instincts, so far as they involve an element of mind, are exactly on the same plane as pleasures and pains. In them mind neither assumes the character of a prophetic adaptative power, nor becomes of the nature of a guiding principle, but is still merely a factor conservative of life.

#### § 4. *The Power of Mind in Man.*

While, then, we insist on the fact of the conservative power of mind, and the significance of the pleasurable feeling of existence, we must carefully abstain from assuming that the power in mind, which is operative in the evolution of animal-life, has exercised a direct influence over the conditions of evolution. The manifestations of mind, as they occur in the life of the lower animals, are themselves part of the phenomena subject to the law of the evolution of life, and are changed in exact accordance with the rule of the survival of the fittest. Natural selection acts upon the mental manifestations within one horizon, and bequeaths the result to the next horizon. And pleasures and pains, instincts and intelligences, do not in the lower animals transcend the horizon of present experience. They are conservative so far as the actual, not the possible, is concerned.

But while this is so, we cannot but notice that in actual fact the survival of the fittest has been so far associated with mental qualities that there has been a progression upwards from lower to higher intelligences and orders of feeling, until we have a culmination in the intellect and emotions of man; and also, that in the outcome of the process of evolution man, by virtue of his intelligence, is to a large degree emancipated from the severer aspects of the struggle for existence.

Man through his mental adjustments has attained to a degree of power over Nature, and reigns to some extent in place of natural selection. There is no check or limit, beyond the conservative one, to the action of mechanical processes upon the lower animals. The power of mind is in them

subservient to the changing conditions of life. And although we mark that as the degree of mental life becomes higher, an animal is able to make intelligent adaptations to meet wider needs, and that instincts, so far as they are intelligent habits, give evidence of mental adaptations appropriate to general needs; yet these adaptations are still strictly subordinate to natural law, and neither mental effort nor the power of intelligent adaptation is able to directly control the course of evolution. But in man a power of mind is manifested by virtue of which Nature becomes a servant, and is no longer a master.

By the accumulated experiences of his ancestry, as expressed in the protoplasmic adaptations of his nervous system, and by the influence of the social bond, as manifested in the formation of language and the contact of mind with mind, man attains to that range of consciousness of relations which brings with it self-adaptation. And we discern that, at first conservative of animal life, and next formative of the bonds of union between individuals, mind has slowly realized itself in the universe, until at length it obtains control over the physical conditions to which in its lower stages of development it was subject.

Mind in man is no longer in absolute bondage to the protoplasmic law. Man is able to understand the order of Nature, and adapts himself to it in various ways. Naked in body, he bids defiance to climate by providing himself with suitable clothing: subject to the influence of varying seasons, and exposed to an uncertain food supply, he directs his industry so that each year yields him the necessities of life, and one part of the earth provides for the needs of another: freed from the care of providing his daily bread, he spends his higher energies on what lies beyond utilitarian ends: and by his system of education he is continuously adapting himself to wider and more complex conditions of life. And not only does he thus rescue himself from the operation of physical law, but he also controls and directs the evolution of other organisms, both plant and animal. He turns the earth into a garden of delights, and the forms of animal life are developed to minister to his needs and pleasures.

Some animals he exterminates; others he tolerates; and the horse, the ox, the sheep, the dog, the pigeon, and the singing bird, become objects of his solicitude and care.

§ 5. *Pain in relation to the Development of Mind.*

Mind in man becomes in a measure free from servitude to the protoplasmic law; and so far as its higher manifestations continue to pertain to the order of evolution, the evolution of mind must take place under a different law.

But before we proceed to enquire into this law, it will be well to review the teleological bearings of the position at which we have arrived. Mind, through the medium of protoplasmic adaptations, enters into relation with the external order of the universe. It finds in certain experiences of the physical order agreeable feelings, and in others disagreeable; and it endeavours to maintain the order of experiences which yields the one, and to free itself from that which yields the other. This the conditions of existence enable it to do; and there arises, associated with life, the pleasurable feeling of existence. And from this stage onward there occurs in the manifestations of mind a continuous rise in the order of experiences, as life becomes regulated by instincts and rudimentary reasoning powers, until at length in man the universe becomes realized as an object of thought, and as the sphere of the mind's own pleasurable activity. In all this we mark a progression; and it suggests to us that the law of the protoplasmic evolution—and, therefore, the power manifested by the physical order relatively to life—is the tutor of mind, which, while it controls the lower manifestations of mind, at the same time teaches and informs the mind so as to make assured its ultimate ascendancy over physical conditions. And if this be so, and the physical order be subservient to mind, may it not be that those conditions which, when discussing the argument of design, we found to be unfavourable to the well-being of life, and, in relation to life, to directly negative a beneficent plan, are not unfavourable to the order of mind, and are, in relation to the evolution of mind, suggestive of a final cause?

We have already drawn attention to the preservative use of pain, and the marked significance of the struggle for existence in the development of mind. And it is not too much to say that many conditions which are in general the cause of pain and loss to sentient life are, for the very reason that they cause pain, educive of the higher manifestations of mind.

Pleasure and pain are correlated feelings, and tend in the lower animals to the preservation of the organism in an equilibrated condition of life. But conditions change; and possibly thereupon an action which is pleasurable to an animal becomes no longer conservative of life, while one that is painful does. The animal, therefore, under such circumstances must cease from the pleasurable activity, and endure the painful one; and pain may thus become a condition of existence until the life has again become equilibrated. Indeed, we may state the general rule—that all changes of a marked kind in the conditions of life must entail a more or less great disturbance in the relation of acquired pleasures and pains to the well-being of life; and that pain consequently becomes a condition of existence, and continues to be so until harmonious relations are brought about with regard to the new conditions. There will be, consequent on such changes, a selection of those best able to resist a pleasure that has become inimical, or endure a pain that has become serviceable; and a survival will take place of those in whom the relative amount of pleasure in the act to be resisted, or of pain in the act to be performed, is the least. Finally, equilibration will ensue, in which the pleasurable activity has disappeared, or the painful one has become pleasurable.

But it is evident that the endurance of pain, as a condition of existence, can have effect in producing equilibration only in the case of man, and perhaps in the cases of a few of the animals most nearly related to him. So far as we know the nature of the lower animals in general, they never endure pain, except involuntarily; and we frequently find animals, and also unreflective men, persist in a pleasurable activity, and avoid a painful one, to the great disadvantage of their lives. The puppy that devours flesh as food disorganises its

system ; and the man who will not endure the pain of labour, or the discomforts of restraint, becomes an outcast from society, and a vagrant in our highways, or a denizen of our city slums. And no doubt, as life-forms have developed in organization, and the conditions of life become more complex, many animals have become extinct because of their persistence in pleasurable activities, when such were no longer serviceable, or had become inimical.

We assume, then, that pain as a condition of existence applies in general only to man, and that it is with regard to action as such in man that its beneficent influences, if any, are to be discerned.

And there can be no question but that, in the case of man, there takes place, to a very marked degree, a reversal of the general action of pleasures and pains on the welfare of life, and that the endurance of pain becomes a veritable condition of human progress, and leads to the evolution of those mental and moral qualities which act as restraining influences on the feelings and desires of the moment. The general conditions of the life of man demand the exhibition of a certain degree of forethought, and the exercise of a due measure of prudence ; and every member of a civilized community is more or less required to look beyond the feelings of the moment, and, if prudence demand it, to endure pain in preference to indulgence in immediate pleasure. Moreover, as man is always being placed in more or less changed conditions on account of his progress in civilization and the arts of life, the time required to adjust his acquired pleasures and pains to the new conditions of life does not usually obtain ; and the form of survival which depends on the character and degree of existing feelings in consequence gives place to the form of survival which depends on the evolution of restraining mental and moral qualities. Those in whom there are elements of courage and endurance to bear pain, or of self-control to turn from the pleasurable and embrace the painful, possess an advantage in the struggle for existence ; and we have as a rule the survival of those who are able to resist the pleasurable and embrace the painful through the display of courage or of self-control.



And even if we take the view that the higher mental and moral qualities are the result of more refined trains of consciousness, in which pleasurable emotions are called up in sufficient strength to overpower the painful emotions for the time being; that mere animal emotions in this way become controlled by the refined emotions associated with the intellect, and that there is in consequence a selection of human units in whom the storage of emotion on the side of prudence and self-control is sufficient to check the barbarous impulses that would yield to the vivid emotion of a present pleasure or pain, an evolution still takes place under the condition that pains must be borne which have become wholesome, and pleasures resisted which have become harmful. And the truth remains that, under the reversal of which we have spoken, mental qualities are evolved in opposition to physical pains, and refined emotions arise to subdue the inimical forms of pleasure.

Indeed, to so great a degree does the reversal of the general action of pleasure and pain, as conducive to the welfare of life, prevail in civilized communities, that a wise parent educates his children to despise physical pain, and to be indifferent to the grosser forms of pleasure; and in society at large the coward is judged to be contemptible, and all who are incapable of subduing an impulse in obedience to a principle are regarded as weak. Also, the general consensus of human thought and feeling is distinctly in the direction of subordinating merely animal enjoyments to the principles of a higher life. And many even of those who know not the higher life profess themselves to be guided by its principles while they disregard its obligations, as is strikingly seen in the inconsistency between the general agreement of opinion, on the one hand, with regard to the delights of knowledge, and the satisfaction to be experienced from the communion with Nature which knowledge establishes, and the well-known fact, on the other, that the vast majority of people weary of the toilsome process by which true knowledge is to be acquired, and are in love with knowledge only so far as it ministers to their immediate pleasures, or tends to their success in life.

We observe, then, that pain calls out, or tends to call out, the higher mental attributes of man; and that it is a veritable condition of human progress. But notwithstanding this, there still remain insuperable objections to its character as a true teleological factor. Pain, if a condition of progress, is also inseparably attached to the existence of sentient organisms; and the objection we took to Professor Momerie's view of the argument of design applies here with all its force. Present conditions tend so manifestly to ultimate death, that nothing in the present sphere of things—which in certain stages of evolution, or during particular periods, makes for progress—can be held to be evidential of a Divine Plan. And not unless we have evidence that the progress to which pain is subsidiary is directed to an end beyond the present sphere of things, can we infer from the action of pain the existence of a Divine Purpose. Hence, though we may conclude that the physical order, with all that is contained in it, is subservient to the development of mind, we are not thereby advanced in our teleological conceptions beyond the position we arrived at on the survey of the protoplasmic evolution. For any further advance we must look to the law which governs mind when it has passed beyond the control of the physical order.

#### § 6. *Present Conditions in relation to Mind.*

We must not, however, incontinently assume that the relation of mind to its present environment is such as necessarily implies a Purpose beyond present conditions. On the face of it there is no reason why present conditions should not be the sphere of the perfect manifestation of mind. On the contrary, there is every reason why they should be. The very fact that mind exists is conclusive that the conditions of life are, in a measure at least, suitable for its existence. And if there be certain elements in the present constitution of things, which rob the progress of mind of all significance with regard to present conditions, these cannot be taken without examination to be of such a nature as to imply a Purpose which has reference to other conditions.

Among materialistic thinkers it is generally assumed that the sphere of life has in it a healthy self-adjusting energy. And it is argued that there are grounds in Nature which justify this assumption. Nature adapts us to continuous pain by deadening our sensibilities; and the experiences of life bring with them pleasurable adjustments to the conditions of life. It is also confidently affirmed that we may, by carefully observing the actually existent, and adapting ourselves to the conditions of things as we find them, attain to that harmony of being which our mind demands. And in the *Natural Religion* of the author of *Ecce Homo*, in which is contained the most subtle presentment of the materialistic philosophy which this age has seen, we are asked to view morality, the sum of human experiences, as the good, and of one family with beauty and truth; and, emancipating it from the creeds, we are exhorted to permit it to become, in alliance with art and science, the groundwork of the enjoyment of a higher life.

Before, however, we allow ourselves to be influenced by these views, let us carefully enquire if they be really in accord with the actually existent, or if in truth they stop not short in their regard for what is existent, at the very point where the actually existent begins to enter into conflict with them. The natural religion that calls us to the enjoyment of the so-called higher life of creedless morality, asks us to bend to Nature's law and worship Nature's unity and beauty. It recognises, therefore, an order of the universe. What order? The order that prevailed before the evolution of the relations of atomic matter; that, in the earlier stages of evolution, manifests itself in the interactions of the physical forces, in the adaptations of plant and animal life, and in the preparation of the universe for the manifestation of mind? The order that, in the later stages of evolution, takes a new departure and develops an internal order of consciousness, so that eventually the universe becomes realized as an object of thought? Stage by stage we have seen the evolution of this two-fold order, each stage marked by a rise in complexity of adjustment, until man stands on the earth in his bodily adaptations an expression of the harmonies of the universe, and in his mental powers a consciousness of its

manifold relations, of its evolution, and of himself. Is this the order to which we have to bend? Evidently not. We are asked to worship the emasculated portion of it, which is coldly materialistic, and barren of all regard for the order manifested in mind.

Again, looked at from another point of view, as an outcome of the religious sentiment, natural to, and actually existent in the human mind, we cannot fail to see that this misnamed natural religion is but a parasitic growth on a sturdier form of belief. It professedly measures the ground common to aggressive science and religion; but its standpoint is really that of the Positivist Philosophy, that is, that of a materialism which attempts to assimilate and make a syncretism with itself of the expectations and consolations of the Christian Faith. And it marks merely the transition between the old form, in which men gave religious significance to the universe, and the new form, which is destined to grow from the ashes of the old. Man's mind has always been at work in the universe; and his interpretations of the universe, arising from the projection thereinto of his religious activity, have undergone reconstruction with every advance of knowledge. In early historic times we had the reign of fancy expressing itself in pagan superstitions. Then came the age of the imagination, which, resting on a more secure view of Nature, constructed on the one side a materialistic, and on the other an idealistic view of the universe. Next followed the reign of the understanding, in which proofs became essential, and evidences of design were sought for; and the decay of this age is marked by the scepticism which expresses itself in positivism. But the positivist does not co-ordinate. He accepts things as they are; and, unable not to believe in a true harmony of life, he is content to take the fact of human progress as an inspiring motive and a sufficient guide to the conduct of life. The positivist must now give way to the evolutionist. We are at the noonday of reason, when the human mind must co-ordinate the universe, and interpret its presentation.

Nature itself forbids a rest in present conditions as satisfying to the mind of man.

At first sight there appear to be many reasons in favour of concluding pain and suffering to be factors in life that tend towards elimination, not indeed with reference to their existence, but with reference to their inharmoniousness. Life is a perpetual struggle, that advances along the line of acquired adjustments and harmonies, and though man certainly becomes cognisant of greater pains, both mental and bodily, and is afflicted with the consciousness of moral evil, yet at the same time he is not without compensating attributes that diminish the intensity of the one, and subdue the discord of the other. An increased and refined nervous organization is more subject to pain; but it enjoys pleasures unknown before, which mitigate the severity of pain. And the *Natural Religion* maintains that in Nature, and the natural affections which repose on Nature, we have means of enjoyment which, if cultivated, we shall find to be Nature's own remedy for the ills of life. Such, it is asserted, is the teaching of the poets Wordsworth and Goethe, in whose writings is found the inculcation of a natural religion, which is fresh and untrammelled, and which gives a true harmony to life.<sup>1</sup> And in addition to this consolation of Nature, it is also asserted, that from many other directions we experience ameliorations that weave themselves into the tissues of our lives. The discoveries of medical science tend to remove many of the great pests of animal life; and the time may possibly come when man shall be freed from the remorseless devastations, to which he is now subjected by the minute parasitic organisms which make him their home. The evolution of society also is enabling the human units to acquire that altruistic attitude of mind in which the common good of all is preferred to individual interests; and when this is accomplished we shall have the exhibition of sympathies which will not be among the least of the many compensations of life.

At present we see progress and growth; and it would be hazardous to fix a limit to the evolution of humanity. We

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<sup>1</sup> We leave the reader to judge of this with reference to the poem, "Peter Bell."



may exhaust our coalfields; but before then, new forms of available energy may have been made subject to the arts and appliances of man. We may speculate upon the increase of population, and see in the future a multitude of social units who will not be able to find standing-room and feeding-ground upon the earth; but we know not what processes the human mind of the future may devise that will render this speculation fanciful and inane.

And yet, as we have said, Nature itself forbids a rest in present conditions as satisfying to the mind of man. Science points to a time when the life of the earth will die out; and progress, however indeterminate, is yet conditioned by the physical limits and order of the universe. Death will not cease to prevail; and though we may extol the office of the physician, we must not forget that the physician has been called upon to fulfil his function in society purely because there are pains—natural pains—to combat. New forms of disease show themselves with every advance of life; and if disease in one form is conquered, another rises to take its place. The earthquake and the storm will not cease; and, though we may endeavour to understand their lines of action, and seek to build our cities of the future beyond the lines of the one, and to guard against encountering the probable paths of the other; there are slow and almost imperceptible forces at work that may change the trends of continents, and reduce to waste-paper the laboured statistics and records of centuries of seismographic and meteorological observations. Old forms of industry give place to new; and each change produces, for a time, a sharp degree of want and suffering, until artizans, educated in the old forms, have become practised in the new; and we cannot assume that the spirit of political economy will be more generous in the future than it is now, and pay compensation to the old industry for leave to start the new. War has not given place to a more equitable mode of settlement of international differences; and, though we may express confidence in the prowess of the more enlightened nations, we know not how far physical decay and the arts of peace may unfit them to keep in check a chronic barbarism

beyond their borders. All these are factors left out of sight as we colour the condition of mankind with the roseate hues of the æsthetic sentiment. We know not how soon humanity may be thrown back upon the roots of its being; and society be seized by the paroxysm of a violent distemper, similar in kind to the wild frenzy of the first French Revolution, or that which marked the outbreak of communism at the close of the siege of Paris. Now we are in a healthy condition, and able to resist these distempers; but there is no sanction to be derived from Nature that we shall continue so, except, perhaps, that which we derive from the general stability of natural conditions, and the slowness of evolutionary changes. But however slow, these changes tend to ultimate death.

It may be replied, however, that ultimate death need be no terror; that humanity, having run its course in healthy adaptation to the conditions of life, will, with the growing astringency of these conditions, sink senilely into rest. But, manifestly, to justify even this form of positivism—to pass over much that is speculative, and yet assumed as true—the slowness and permanency of the processes of evolution must be insisted upon. And as to insist upon these is to admit the truth of evolution, we cannot permit anyone who would advocate this view, to borrow one conclusion of evolution without borrowing all.

Judged from the point of view of evolution, positivism, in any form, does not give a satisfactory interpretation to the teleological significance of evolution. From the physical order of evolution we have inferred that a teleology of some kind must exist. The protoplasmic order so far emphasizes this, as to point to a power controlling the nature and form of the adaptations of life; and the psychological order as we have just seen manifests to us that this power is subservient to the development of mind. But positivism, in spite of its worship of humanity, instead of following up this teleology to a glorious consummation, makes the order of evolution return in upon itself; so that beginning with the evolution of the worlds, and running through the orders of life and mind, the order of evolution ends, at last, in the ashes of the worlds with which

it began. Positivism sees no teleology in the rise and growth of consciousness. It is founded upon the assumption that there is in the universe nothing spiritual, except perhaps an elusive suggestion of such in the brain of man; and individual consciousness is to it nothing more than the fleeting foam that flecks a broken wave. But for unnumbered ages, mind has grown and grown upon the earth, till now it culminates in man; and in the form of man it looks abroad and makes the worlds around reveal themselves. Then, can it be that man is yet no more than that which he reveals? Nature through countless ages of pain and progress has risen to the consciousness of self. Is this only that it may sink again into unconsciousness? Are intelligence, and love, and man's enraptured wonderment no more than coruscations, fleeting in an hour across the iron visage of fell fate? Man is a product of the harmonies of the universe. And has mind come through its long progression from the rudimentary sensations and feeble instincts of the lower forms of life, to the rich inheritance of the emotions and sympathies of man, advancing ever to higher heights of feeling and of thought, until at last it is conscious of the wondrous harmony and order in which it lives, all to no end, no purpose, but to realize its own nothingness, and to gaze with stupor into the eyeless sockets of an unspiritual universe?

From the positivist's dreary denial of fellowship with God, we turn to question our own being. We find there a sense of beauty, a love of truth and order, and emotions of wonderment and awe. We know ourselves, indeed, to be part of a mighty social organism, whose life is nourished by the living water of human sympathies; but we discern that our sympathies are wider even than the claims of humanity, and go forth from us, not only towards other social units, but also towards all Nature. The course of evolution has bound us to the universe in indissoluble bonds of sympathy. And yet, with the motions of sympathy rising within us, we find ourselves subject to an opposite influence that expresses itself in egoism and in pain. We long for peace and rest of heart, and find that self is the greatest enemy of our peace. We stretch out our hands to

join in sympathy with those of our fellows, and withdraw them wounded by the sword. And thus distressed, we reach forward with longing after-hope to a time when an amelioration of some kind will subdue these discords. And in proportion to our faith in the harmonic relation of mind to the universe, so is the glow of intensity cast over our emotional activities, whether religious, moral, or æsthetic.

Nature, however, forbids us to conclude that progress here is indeterminate. Nay, she tells us that all life is merely a burning that one day burns out. And though we may conceive of a condition of things in which death will lose its terrors, and assume for us the welcome face of "the usher appointed by love to lead us to assured repose," more things are demanded from love than to soothe the sorrows it cannot heal. And even if we grant—what sober thought in every way denies—that a harmonic concord may be evolved between man and his present conditions of life, this does not answer the enigma of the pain and sorrow now existent.

Man has slowly attained to his present position on the earth by the pain of his body and the sweat of his brow. The fruits of the earth, the breeds of domesticated animals, the ameliorating influences of society, are only what they are by the care and thought which have been bestowed upon them. We to-day in these things inherit the labours of our fathers; and it is melancholy to think that if a good day be coming for the human race, when it shall be freed from its groaning and its travail, our fathers who toiled for us will not participate in it.

How far would the evolution of harmonious relations between man and his present conditions of life compensate for the pain and sorrow of the past, and the pain and sorrow now existent? Or again, what recompense has positivism in store for the best and the noblest of men, who have given their lives for mankind, and watered the earth with their blood, in self-sacrificing devotion to the claims of truth and human sympathies? What recompense will it give, say to the Galilean—for no one disputes that He lived—the noblest, the holiest, and the purest of men, to Whom was given the deepest

cup of woe, to the Best of all the bitterest? Will the future give to Him fit recompense? These things perfect harmony and love demand.

Nature is to us so completely unified, and the course of evolution so strictly conditioned, that we can think of nothing short of the most perfect as prevailing in it. There is mind in the universe as well as matter. And there is nothing to teach us that the order of matter overrides the order of mind. Nay rather, it trains it, and educates it, and finally it is subdued by it. And the order of evolution has for its culminating characteristics the subjection of physical relations to the adjusting power of mind, the realization of the universe as an object of thought, and the sympathetic motions of the spirit of man outward over all things. Our sympathies are as much a part of the order of evolution as the material relations of things; and no interpretation of the universe can give to the teleology of the order of evolution its true significance which subordinates that which crowns the order of evolution to that which begins it. If therefore our sympathetic motions be true, the order of evolution must be adequate to fulfil the claims our sympathies make upon it. And as this fulfilment is not to be found in the material order of relations, we declare that there must be in evolution a higher order of relations in which it is. Spiritual contact with the Divine must be a truth. And by whatever prostitution of their spiritual nature individual men may cheat themselves into the belief that an unspiritual view of the universe gives a true harmony to life, the general testimony of humanity will ever be that if grief repel the thought of God Omnipotent, no less does grieving life reject the creed of cold materialists.

No materialistic creed can be universal; and no system of positivism founded upon it can satisfy the wants of all. Though man does not live by bread alone, man so long as he lives here must have bread. He cannot live on beauty, or feed on thoughts. And though positivism may inculcate tenderness towards suffering, and reach out a ready hand to the needy, it has no consolations in store for those who have loved and lost, or those whose lives are passed in unremitting toil. It is a



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creed for the leisurely classes, and not for the toiling masses. With all its pretensions it is cold and unsympathetic, and leaves, without comfort, the load of human misery heavy on those who are buffeted by the world; and it is an answer to the enigma of pain and sorrow only to those fortunate few who are so happily blessed as never to have beheld the tensely drawn outlines of the one, nor the pallid dejection of the other.

## CHAPTER VIII.

### THE LAW OF SYMPATHETIC RELATIONSHIP

#### § 1. *The Criteria of a Divine Purpose.*

IN the survey of the evolution of matter we attained to the recognition of an order of the universe in which, from a primary organization, interdependent organizations are evolved; and, from the general consideration of the facts of the case, we concluded that the conception of a teleology of some kind was imperative. Also, by the examination of the evolution of life we further attained to the idea of an adjusting principle, by means of which the forms of life enter into correspondence with the external physical order, and we recognised that a power was manifested, controlling and directing the assumption of adaptative features. Further, in the evolution of the manifestations of mind we distinguished three stages: first, that in which mind obtains a place in the order of evolution as a conservative factor in the development of life; second, that in which it endows life with the pleasurable feeling of existence, and enters into direct relationship with the law of the protoplasmic evolution; and third, the stage when, tutored by the physical order, mind in a measure displaces the protoplasmic law, and enables man to attain to the victory over physical conditions; and from the consideration of these stages we were carried forward to the conception that the power manifested in the physical order is subservient to the order of mind. But from the manifest imperfection of the conditions of life relatively to the well-being of conscious life, and also from the failure of present conditions to fully satisfy the demands of mind, we have found that unless we come into view of a Purpose which has reference to other than present conditions, no finality can

be ascribed to the ministry of the physical order, and we are urged forward in search of the evidences of such a Purpose to the law of the evolution of the manifestations of mind when these have passed beyond the control of the protoplasmic law.

We have seen that there is a physical order which obtains in matter and which, expressing itself as a power in the law of natural selection, prevails in the formation of all the adaptations of plant and animal life. This order we interpret to be a system of interdependent relations, bound together and conserved by the persistence of a primary form of relation. And we have also seen that at a certain stage in the evolution of this system of interdependent relations a consciousness of relations begins to appear, and that this consciousness of relations, through the adaptations of the nervous system, increases in range of vision until it is able to cognise not only the relations which affect it directly through the medium of the senses, but also relations which obtain generally throughout the universe.

There is, in addition to the physical order of interdependent relations, an order of consciousness of relations or of mind. And in the intellectual growth of mind over and above its primary perceptions there is, through the influence of natural selection on the ganglia which supply the physical conditions necessary to its manifestations, added to mind in the form of intuitions the teaching of its own experiences. The implications of its own synthetical powers become unfolded, and in its higher manifestations mind is able, with regard to the form of the relations of the universe, to arrive at judgments most general in character, and to build up by means of the imaginative faculty certain pure sciences of the utmost value in investigating the order of the universe. Thus we have the science of geometry built up upon the intuitions unfolded from our experiences with regard to space; and the science of kinematics—together with all the branches of the calculus which depend on kinematical ideas—built up upon the like intuitions with regard to our related experiences in space and time. Moreover, this intellectual growth of mind is also accompanied by increasing degrees of discrimination in matters of feeling and conduct, in which directions we also find experiences

organised, as it were, into instinctive feelings and habits. Conduct dependent upon feelings is seen to play, throughout all degrees of mental life, a conservative part in the struggle for existence. In the lower animals, by the bias towards pleasurable activities and the aversion to painful stimuli, it ensures the equilibrium of life in a state of enjoyment, as far as the conditions of evolution permit. And at a higher plane of development, when volitions share with organic pleasures the task of conservation, we have developed the power of voluntary attention, in order that the sensations received may yield to the full the messages they bring; and a finer discriminative power being thus called into exercise, a subtler line of conduct is observed. Finally, in man we have the ordering of conduct into uniform habits, social observances, and moral laws; and these habits, observances, and laws, form the controlling factors of life, and become organic through the adaptation of the individual to the society in which he lives. For instance, when the social life has begun, the feeling of shame and the desire for approbation are both more or less instinctive; and even in morals, the sentiments of justice and truth are not without a natural foundation in human nature.

Thus in the order of mind, interpretative mental elements have what may be called a natural basis in the mind, and build up an interpretative order of mental relations; and if a purpose prevail in the universe which has reference to other than present conditions, intimations of it may reasonably be looked for in this interpretative order of relations. Indeed, a purpose transcending the physical order can only be inferred from facts which embody adjustments to, and are interpretative of, the sphere of relations to which such a purpose pertains. And to have clear testimony from the higher manifestations of mind of a purpose not fulfilled in the present order of things, it ought to be demonstrable that the order of consciousness of relations, including the pleasures and pains, the emotions and desires, the thoughts and volitions, the intuitions and sentiments, which mark its internal states and activities, ceases when it becomes interpretative to be altogether relative to the physical order, and becomes, so far as it has ceased to be so

relative, relative to another sphere of relations, and governed by an independent law.

And it is to be noted that the procedure here indicated is not one of a philosophical enquiry into the basis of our intellectual æsthetic and moral intuitions, but one of a scientific examination of the law which prevails in their evolution. We premise that all intuitions, instinctive feelings, and moral sentiments depend on fixed relations, and that they have their place in evolution, and become interpretative because of these fixed relations; and the inquiry we propose is one which has regard to the sphere of the fixed relations, and the law pertaining thereto of the intuitions, instinctive feelings, and moral sentiments, prevailing in our higher manifestations of mind. Just as on the lower plane of mental life, habits arise from adaptation to fixed external relations, so in our higher mental life there arise social feelings, moral dispositions, and, as we shall hereafter find, other mental manifestations which, becoming instinctive or intuitional, must also be dependent on fixed relations; and the immediate problem before us is whether these fixed relations pertain, not only to the physical order, but also in part to an independent order of relations which is spiritual and not material.

But if, on the one side, it be held that the mind has experiences which, though evolved in connection with the physical order, belong to an order which is essentially independent of it, and it be also maintained that these experiences give rise in the mind to intuitions and sentiments which transcend the sphere of physical relations, and which are therefore interpretative of fixed relations belonging to a different sphere; and if, on the other side, it be objected that the mind is concerned only with the relations of the physical order and can have experience of no other, and it be also contended that the interpretative mental order is interpretative only of the physical order, on what principle are we to decide the question? It is the duty, of course, of the affirmative side to establish its position. But it is not enough for this side to demonstrate that the mind has experiences which rise into intuitions and sentiments apparently transcending the physical order. We require criteria which shall test the question of their independence,



and remove all doubt whether they are relative to the physical order.

Many, for instance, regard infinity as an intuition of the human mind, which is a proof of the objective reality of something answering to it. Even Bishop Butler says:

“Indeed, we ascribe to God a necessary existence, uncaused by any agent. For we find within ourselves the idea of infinity, *i.e.* immensity and eternity, impossible, even in imagination, to be removed out of being. We seem to discern intuitively that there must, and cannot but be, somewhat, external to ourselves, answering to this idea, or the archetype of it; and from thence (for *this abstract*, as much as any other, implies a *concrete*) we conclude that there is, and cannot but be, an infinite and immense eternal Being existing, prior to all design, contributing to His existence and exclusive of it.”—(*Analogy of Religion*. Part I. chap. 6.)

But if we carefully consider what is contained in the conception of infinity (excluding from it the cognate idea of eternity), we shall find that it has reference altogether to physical relations in space, and that only when we construct, by means of the imagination, images of it in space, do we form a definite conception of it. We may think of immensity by endeavouring to form a conception of the stars of heaven, each of which is a sun manifesting energies that stun the mind with their magnitude and potency. We may also think of an infinite magnitude by conceiving a line to be drawn from the earth to the most distant of the stars, and then prolonged indefinitely into space; but when we withdraw our thoughts from what we experience relatively to the spatial relations of the physical order, we find that nothing real can be thought of with regard to infinity, and that the conception of it then becomes one of the kind which Kant calls “empty conceptions.” Moreover, when Bishop Butler premises that every abstract implies a concrete, and assumes it to hold good in the case of an abstract, for which no concrete can be found in the field of sensuous experience, he errs, in the first place, in projecting the notion of concretes corresponding to abstracts beyond the sphere in which the correspondence is known to

exist; and, in the second place, in applying to the form of thought that which is true only of the matter of thought. And he ought certainly to have examined the nature of the abstract, resident in the idea of infinity, before he concluded it to correspond to a super-sensuous concrete.

There are many abstracts, for which no concretes are to be found in the field of sensuous experience, which have no meaning when they are dissevered from sensuous experiences, and regarded as implying a concrete beyond it. And, in addition to the instance of infinity, we may also adduce that of eternity, the conception of which is derived from our experiences in time, and cannot be projected beyond the temporal. Even the conception of a First Cause is an empty conception. We only know of the causal relation of things as involved in physical relations; and our judgment of the causal (as distinguished from the necessary) relation of objects has no meaning apart from the mind's experience of related objects. The conception of cause and effect, in short, pertains only to changing phenomena, and cannot be transferred to what lies beyond the sphere of change.

These are examples of conceptions apparently transcending the sphere of physical relations, but in reality, as is manifest by their negative character when projected beyond it, relating only to experiences within that sphere. And in general all purely intellectual conceptions are of this nature, as might antecedently have been surmised from the fact that the intellectual part of the mental order is that which is mainly concerned with the objective sphere of cognition. It is only in the subjective sphere of experience that we can expect to find conceptions which will be otherwise than negative when projected beyond the physical order. And, as we may state it to be an indispensable test of the independence of a mental order of relations, that intuitions and sentiment pertaining to it must in transcending the sphere of the physical embody conceptions which are positive, and not merely conceptions which when projected beyond the physical order are void of all import, it is only in our emotional and moral being, and in our intellectual as coloured by them, that we must look for this

characteristic. The mathematician, indeed, by refusing to admit into his definitions the limitations which space of three dimensions impose upon them, can arrive at purely intellectual conceptions of space of four or more dimensions; and, interpreting all that he meets with in the universe in accordance with these conceptions, show that the universe is possibly of more than three dimensions. But these conceptions being unsupported by the evolution order are not here admissible.

The test we have laid down, however, is not sufficient to restrain the license which assumes itself privileged to disregard the highway of principles, and to wander like a vagrant into every possible bye-path of thought. If we argue, for instance, from our own internal states or activities, let us say with regard to goodness, or the manifestations of will, it may be objected that goodness after all, though native to the mind, is interpretative only of certain relations of the physical order as expressed through the social bond, and that the argument from the manifestations of will is illusive, what we mistake for will being only the interpretation of certain processes that take place in the brain. We must therefore seek to restrain within due limits this licence of objection, and find an additional criterion by which we shall be assured that the physical order is really transcended.

And this will be found by determining the exact limits within which the physical order is restrictive of mental activities.

The increase of physical relations by changes in the form of relation in accordance with the persistence of the primary organization of the universe, and the control of protoplasmic and psychological relations by means of the protoplasmic law, constitute at once the sphere and the limitation of the physical order. This order prevails throughout matter, and rules over the protoplasmic activities. But in the order of mind increase of relations takes place essentially as an increase in the consciousness of relations. And though this increase is in animal life dependent on nervous adaptations, and therefore on physical increase of relations, its order is different to the order in which increase of relations takes place by changes of relation; and in

so far as it is subordinated to the physical order, this subordination takes place entirely by means of the protoplasmic law. The order of mind in animal life is under the protoplasmic law; and this law is part of the physical order. So far the physical order has an advantage. But if in the order of mind an evolution of relations takes place which is not under the protoplasmic law, this advantage ceases and the order of mind can be no longer controlled by the physical order; yet inasmuch as an evolution still takes place there must be an order of relations, transcending the physical, to which the evolution belongs. There is a sphere in which the physical order is restrictive of the activities of mind; but if there be mental activities outside of this restricted sphere, these must be held to belong to an order different to the physical. And if, perchance, we can go a step further and discern a law, indisputably independent of the physical order, prevailing in such mental activities, we may at once infer the independence of the order to which it belongs.

Mental activities transcending the physical order may be unquestionably products of evolution, and may be derived from what were originally mental adjustments to the physical order. But inasmuch as they continue to exist and have a place in the order of evolution when they have ceased to be relative to the physical order, their derivative nature is no argument against their testimony to the independence of the order to which they essentially pertain. And there need be no difficulty felt by this when we reflect that the mind, in its consciousness of the relations of the physical order, endows that order with elements derived from its own. We give to the vapour of the clouds, colour; and to the vibrations of a bell, musical tone. Moreover, each order of evolution presupposes the conditions of the preceding orders of evolution; protoplasm is in its physical aspect a product of the evolution of matter, and life manifests its activities only under the conditions of force; also mind in its lower manifestations is conscious of physical relations only by means of the adaptations of the nervous system, and thought is dependent on the vitality of the brain; and it is therefore quite in analogy with the previous orders of evolution that activities of mind which transcend the physical order should

be dependent on elements derived from the consciousness of physical relations.

And applying the criteria, we have laid down, to the fourth or spiritual order of evolution, we shall first show that the social organism cannot be taken to be exclusively the expression of physical conditions; and, assuming a spiritual order of relations to exist, it will appear reasonable that the social organism includes adjustments to it, so far as spiritual relations affect communities. Next, we shall demonstrate that the physical order cannot be held to be restrictive of the whole activity of mind; and that in the order of the sentiments we have evidence of mental adjustments in which man's life is carried beyond the sphere in which it is restrictive. Finally, we shall prove that in the order of the sentiments we have positive conceptions of relations which obtain under a spiritual law; and that this spiritual law cannot be explained as relative to the physical order, but must be regarded as pertaining to an independent order of spiritual relations. And the establishment of these positions will be the proof of our position that there is a law operative in the universe, which justifies us in looking beyond present conditions to a Divine Purpose prevailing with regard to other conditions.

### § 2. *The Social Organism in relation to Mind.*

There is at the present time a prevailing opinion that the domain of mental life, and the evolution of the higher attributes of humanity, are strictly conditioned by the life and vitality of a social organism. And to this opinion we should be prepared to give a qualified assent, were it not that the social organism is generally regarded as exclusively the medium of the operation of the physical order on mind and man. The bare fact that the community is something distinct from the individual is taken as a proof that the community is part of the material conditions of life; and to this there would be no objection if the social organism were built up out of purely protoplasmic elements, and its units were like trees in a forest. But the welding influences of human societies, as of animal societies in general, are instincts



and sympathies which pertain exclusively to the order of mind. And not unless the whole question at issue be begged by assuming the order of mind to be itself a part of the physical order, can the social organism be regarded as altogether the expression of physical influences and conditions. Strictly, the social organism is more of the nature of an organ of mind than of the nature of an organization controlling the mind; and it cannot be held to be expressive of physical conditions in a greater degree than that in which it is subject to the selective law of the external physical order.

Man has so far conquered Nature, that it is not necessary for each individual man to acquire in his own person a new bodily organization to meet the needs of new conditions. Indeed, we may go further, and say that civilised man to some extent creates his own conditions. Be this as it may, however, adjustments to new conditions arise from the combination of individuals into societies. And under new conditions a social organism is formed in much the same way as colonies of cells join together, and form a protoplasmic organism. As cells are modified and united into organs fitted for the functions which, under the division of labour, they are called upon to perform in protoplasmic organisms, so are individuals built up into societies, and societies organised to perform the functions of a corporate life. Social tissues, as it were, are formed, and social organs arise to perform functions necessary to the life of the corporate body. The only essential point in which the social organism differs from a protoplasmic organism is that the members of the social organism are held together for the most part by conservative mental elements, which leave a certain amount of free play to the individual, and not by adaptations which imply the practical surrender of all individual life. And instead of a living compacted whole, in which each of the component parts have yielded their independent life, we have in the social organism an aggregate of individuals held together by bonds or organs which are strong or weak in proportion to the vitality and strength of the feelings and emotions of the individuals as they express themselves in the various sentiments, which are the factors conservative of the bonds or

organs. Thus we have the political organ kept in vitality and vigour by the sentiment of loyalty; the ecclesiastical organ dependent on the religious sentiment; the industrial, upon the sentiment of mutual confidence; the moral, resting upon the consciences of individuals, and upon a recognised moral law expressed in moral codes and the law of honour; and an organ, or a series of organs, as yet without an appropriate name, which concerns itself with philosophy, science, literature, and the arts, and which is dependent upon the love of knowledge and the æsthetic sentiment.

It is noteworthy, however, that these sentiments are themselves to a large extent the outgrowth of the social organism. All organization of feeling and thinking units into a society implies a mental element as the bond of the society; but the growth and extension of the society is largely secured by the co-operation of external factors; and the outward body, as it were, of the social organism is mainly the result of these external factors, which both extend the society and give a wider range to the sentiments which hold its parts together. The political organ, for instance, has been developed by war and conquest; and in many nations there are internal sources of weakness due to the imperfect loyalty of the conquered tribes. The sentiments are necessary to the full life and vigour of the social organism, and where they are absent the society is disintegrated; but they have attended rather than controlled the progressive stages of the revolution.

As in the evolution of protoplasmic organisms there is a progression from the simple to the more complex as new functions, preserving in their structures the marks of a remote ancestry, are gathered round the root activities, so has there been a progressive and historical evolution of the functions of the social organism. The aggregation of man into societies had for its base the family life; and feuds between families, leading to the subordination of one to another, formed the first characteristic of human societies, and gave birth to the military spirit which survives to this day as the arbitrating power between nations. Also in primitive societies, in addition to the welding influence of the sword, a bond of union grew up as families were drawn

together by the enthusiasm of a common religion, and ecclesiastical institutions began to establish themselves. Then, with the aggregation of families into nations and under the influence of theological systems, as various subordinations arose and rights became determined the idea of law became operative, and a growing subserviency of the military spirit to that of law and order took place in the internal life of nations. And finally, as nations spread over the earth, the commercial and the industrial spirit became prominent as factors of social evolution, and a leisured class arose, which, so far as it has not been parasitic on the corporate life, has engaged in the pursuit of politics, philosophy, philanthropy, literature, and the arts. Thus we have the outward body of the social organism as at present constituted.

The social organism must not, however, be understood to constitute an independent order of evolution. It is merely an evolution of higher adaptative features, and with regard to its various adaptations, the same conclusion holds as with regard to the adaptations of protoplasmic organisms. They are adjustments to the order and harmony prevailing in the universe.

But this order and harmony does not necessarily belong exclusively to the physical order. For, granting the existence of a mental order of relations, independent of the physical, it is reasonable to expect, from the fact that the health and vigour of society depends for the most part on mental adjustments, that this mental order of relations will include relations which have reference to man as a member of society, and that therefore the social organism will embody adjustments to it. The social organism takes shape, and is evolved similarly to the manner in which protoplasmic organisms are shaped and evolved, and as the protoplasmic organisms are the medium through which protoplasmic life continues its vitality, so is the social organism the medium through which individual units of men exert their powers and activities. Whatever, therefore, enters into relation with man, as a social being, enters into relation with the social organism. The social organism is not only an organization adapted to the needs of life, but also an expression of man's relations, as a social being, to

the universe. And if man be related to a spiritual order which transcends the physical, the social organism must give expression to his relations thereto, so far as these affect the community. Social life presupposes individual life, and throughout the evolution of the social organism, the individual units of men preserve their individuality, and give vigour to the corporate life by the very exercise of their individuality. Without the full individual corpuscular activity of the units of men, the life-blood of the social organism could not replenish the waste and preserve the health of the social tissues. And a great poet, painter, scientist, or philosopher moulds society quite as much as he is moulded by it. The warrior and the statesman impose upon it conditions and laws. And the religious reformer alters and re-shapes its character and form. In fact, as man, by virtue of his mind, attains to a victory over Nature, and co-ordinates it together for ends of his own, so does he also reign over the form and organization of society. It is true that the same limitations are imposed upon him in co-ordinating social factors, as are imposed upon him in his co-ordinations of physical phenomena. He cannot create, but can only re-combine relations, and derive them from other forms of relation. Yet, nevertheless, the organs of society are shaped and brought into agreement with external or internal relations as these relations are conceived of by man. And it is an absolute desertion of the whole position, that the mental order of relations is distinct from the physical, to concede that the social organism is altogether the expression of physical influences and conditions.

§ 3. *The Respects in which the Physical Order is restrictive of Mind.*

Again, the physical order cannot be assumed to be the condition restrictive of the whole activity of communities. Its action on the social organism takes place altogether through the law of natural selection; and the law of natural selection is strictly confined to the formation of adjustments, which are of advantage in the struggle for existence against other forms

of life or disadvantageous conditions. Such adjustments in communities, therefore, as are not utilitarian, are not under the law of natural selection.

The physical order is restrictive only in the utilitarian sphere of things. And, though much of man's activity is limited to this sphere, it is not altogether so. The acquisition of wealth, the rights of property, the commercial and industrial activities of man, the relations between capital and labour, and all the other organs of the social organism, which are concerned with the provision for the body and the animal appetencies, are utilitarian. So also are the laws of nations, the rights of individuals, politics, police, sanitation, and whatever other adjustments are required for the physical health and animal vigour of society. All labour and thought spent on these is spent with the directly utilitarian end of increasing the means of support, or lessening the dangers to health. But no one can be bold enough to assert that the labours of scientific men, though these are found by experience to minister to the needs of life and society more than any of the direct industrial or legislative functions, are directed to a purely utilitarian end. We certainly profess to encourage scientific research; but is it not true that, without the pure love of knowledge for its own sake, scientific investigations neither flourish nor bear fruit? Nor can any one say that the pursuits of literature and the arts have direct reference to the well-being of society, even though they ameliorate its conditions.

Furthermore, evolutionists who contend for the widest application of the theory of natural selection, find themselves constrained to admit that "there is a possibility of the most useless 'sports' making their appearance, and even establishing themselves in human communities as hereditary qualities";<sup>1</sup> and the higher development of "the mathematical, musical, and artistic faculties of man," is presumably to be taken as an instance of such "sports."

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<sup>1</sup> E. RAY LANKESTER in a review of A. R. Wallace's "Darwinism," *Nature* vol. xl. p. 570.



But surely, whatever finds a place in evolution, must be in some way connected with a law of evolution. Even if we admit that there is room for "accidental variations" to establish themselves "without reference to the advantage or disadvantage of the species," such variations must have a ground for their existence in the order of Nature. We may see the immediate cause in the fact that the struggle for existence does not hem in every side of the organism, but leaves room for variations to establish themselves, independently of natural selection; and we may regard them as "sports," which may or may not disappear when the struggle becomes acute, and natural selection resumes its sway. But they nevertheless exist, because the conditions of existence permit them to exist; and no scientific account of the universe can be complete which does not determine the circumstances and conditions of their existence.

Further, "sports" may be defined as chance deviations from the normal type. And the particular "sports" of human faculty can only properly be regarded as "sports" if it appear that their persistence is local, and that they are liable to be altogether uprooted on the disorganization of the community in which they chance to obtain. Let us take what might appear to be a concrete case. The mathematical faculty was well-developed, and the art of sculpture carried to a high degree of excellency in ancient Greece, and both disappeared with the decay of the Greek spirit. Shall we say, then, that both are to be regarded as "sports"? Not so. For we observe that they re-appeared again with the rise of civilization in other communities. Progress in civilization is accompanied by progress in Science and in Art; and given a state of the social organism in which man is free to give his attention to more than the means of bare subsistence, and the protection of his material interests, he invariably turns to the cultivation of his mind. We are led, therefore, to inquire if the mathematical and artistic faculties be not, together with man's higher faculties in general, related to conditions other than those to which they are relatively "sports." And for evidence on this matter we turn to the higher manifestations of mind.

§ 4. *The Higher Manifestations of Mind.*

The evolution of mind does not end at the point to which we have brought it. In all manifestations of mind the emotional, intellectual, and volitional powers mutually aid each other, and owe one to the influence of the others the growth and perfection of their exercise; but only in the mind of man is there attained the complete irradiation of the emotions by the intellect, and the regulated exercise of the will; and it is precisely in the higher life thus realized that the mind is seen to attain its freedom from the physical order, and to give shape to instead of being shaped by the social organism.

In our emotions we have three ranges of activity. First, the personal, which are particularly related to the individual, and are either self-regarding, or attached to objects in their relation to self; such are the keen enjoyment we have in the exercise of our own activities, the pleasurable feeling of life, the general feeling of satisfaction we have with our own selves, the states of joy, happiness, and peace, the pleasures of hope, success, and reputation, the love of home and parents, and the antipathies and rivalries with regard to other individuals. Second, the sympathetic feelings whereby the pleasures and pains, the joys and sorrows of others become to us through the representative faculty our own, and in which we project our own states and activities into that of others; such are affection for persons, admiration of character, enjoyment of society, love of mankind, delight in the joy of another, pain at the sight of suffering, and pity for distress. Third, the order of sentiments, which arise from the projection of our emotions outside of ourselves, so that they become detached from all self-regard either direct or vicarious; such are the love of knowledge for its own sake, the love of order, the pleasure we derive from the beautiful, the ecstasy we experience at the sublime, the love of truth, justice, and the regard for morality in general, the emotions of wonderment and awe, and the sentiment that finds expression in religion.

And all our emotional activities, whether personal, sympathetic, or of the order of the sentiments, are more or less

under the control of the reason; and in each of them we have to a greater or less degree the realization by mind of a higher plane of development. But it is more particularly in the order of the sentiments that we are able to distinguish the nature of this development, and perceive its freedom from servitude to the social bond as expressive of physical conditions. The sentiments are no doubt the outcome of the evolution of the mind under the conditions of the social bond; but in them we mark the manifestation of a power that gives to and does not take a law from society. And though exercised at first as demanded by the needs of life, in them the activity of mind attains its acme, and man is placed in a new relation to the universe.

And in the sentiments, more particularly indicative of this freedom, our emotions are projected outside of ourselves in four directions—on the universe through the intellect, in the love of knowledge, on Nature through the connection between it and the senses, in the æsthetic sentiment, on the social organism in the moral sentiments, and towards the High and Holy One in the religious sentiment.

From the pleasurable activity of mind, as exercised on the relations subsidiary to life, we derive the feeling of pleasure in all exercise of the intellect; and this, manifesting itself at first in the lower forms of surprise, wonder, curiosity, and the charm of novelty, rises through the delight of discovery, the joys of imagination, and the satisfaction of belief, to the reverence for truth, and the love of knowledge for its own sake. From the pleasure accompanying perceptions by means of the eye and ear we attach agreeable features or qualities to the objects perceived, and from the excitation of the imagination we endow shapes and sounds with the attributes of the sublime and the grand; and these emotions cultivated by taste are transformed from the mere delight in the sensuous elements of light, colour, timbre, and tone, and the bare thrill of the imagination, into the appreciation of the emotional significance of Nature, and the interpretation of it into forms of art. From the discrimination of right and wrong in conduct, as members of a society, we approve what is right or

reprobate what is wrong in ourselves and others; and there is produced in us the growth of a moral sense, which expresses itself as an obligation to do the right and refrain from the wrong. Finally, from the suggestions of our own personality and will, and from the feelings of weakness and need, there arises the sentiment which stands in awe of and worships a Power; and this sentiment, drawing to itself elements of the other emotional activities, asserts itself in reverence, adoration, and love towards the Supreme.

In these directions the mind of man attains its highest sphere of exercise; and it exercises itself therein not by virtue of obligations imposed by the social bond as representing an external material order, but by virtue of its own interpretative order of mental relations. And we have now to demonstrate that the mental activities manifested in these directions cannot be explained as altogether interpretative of the physical order, but must be taken as transcending it, and when transcending it, as governed by a law which is independent of it. And this we shall first do with reference to the intellectual and the emotional spheres.

§ 5. *Inquiry whether the Love of Knowledge and the Æsthetic Sentiment transcend the Physical Order.*

Mind has progressed until in man it culminates and makes the worlds reveal themselves. It speculates on its own nature, and investigates the universe. It contemplates and derives pleasure from the contemplation of the beautiful and the sublime. And it is lost in wonderment and awe at the magnitude and majesty of its own conceptions. Are there not here evidences of an interpretative sphere of relations which, pertaining exclusively to the mind's own internal order, transcend the sphere of the physical?

Man, as a conscious being, is the slow growth of ages. His intellectual life is due to the inheritance of nervous processes and muscular adjustments, in accordance with a process of evolution under the protoplasmic law; and his emotions similarly depend on ancestral adaptations. But though these ancestral adaptations were first stored with reference only to the struggle

for existence, in man they form the basis of a higher life, in which he rises above the selfish plane and places himself in sympathetic relationship with all creation. Observe how pleasurable the activities of the mind are; and how full of emotional significance man discerns Nature to be. How full of grandeur are the heavens! How full of beauty the earth! How deeply mysterious man's own being! Are there not here intimations of something higher than utilitarian adjustments? And are not grandeur, beauty, and mystery, positive conceptions pertaining to the mind's own internal order? The grandeur, the beauty, and the mystery exist only to the mind. Did the meteorites think of grandeur as they clashed together to form suns? Did the flower and the insect commune together of beauty when the loveliness and elegance of both of them were called out by mutual needs? And did the universe brood over mystery when amid the relations of matter there sprang into being the consciousness of relations?

Moreover, what here transcends the utilitarian sphere has always transcended it. In the very struggle for existence, while mind was being developed as an aid to life, its office was not altogether confined to the sphere of immediate equilibrations. The higher sphere of the pleasurable activity of mind has been slowly realizing itself from the first dawn of the pleasurable feeling of existence. All animals have pleasure in life. Pleasure which, undoubtedly selected as the means to an end in the struggle for existence, is nevertheless a purely subjective source of joy, overflowing in play in excess of the need of utilitarian ends in many of the lower animals. Witness the gambols of a lamb and the fun of a kitten! Pleasure that becomes more and more distinctive of life, until in man it becomes an embodied joy.

Man communes with the universe for the satisfaction of his own intellectual being; and rejoices in the revelation of its unity, order, and law. He contemplates its phenomena, and interprets their emotional significance as ministering to and perfecting his own states of enjoyment. The love of knowledge in its lowest form he shares with the inquisitive monkey,



but the pleasures of investigation, and the rapture of the discovery of a new truth, are all his own. He feels satisfaction in discriminating objects; pleasure in possessing knowledge; and wonderment, rapture, and awe, as he rises to the apprehension of the marvellous universe in which he lives. More than meat, more than raiment, are the delight in knowledge and the contemplation of the universe within and without, to the true student of man and Nature. And undoubtedly this love of knowledge and pure exercise of the intellect, though exercised on the relations of the physical order, are part of the mind's own internal sphere of relations, and body forth the positive law that, forgetful of self-interest, the self-conscious energy of man is moved into sympathetic relationship with all outward things. Again, in the æsthetic sentiments which arise from the contemplation of objects purely on account of their beauty or tastefulness, without reference to the desire for possession, and which are contrasted both with the coarser enjoyments of the senses and the pleasures that minister to our needs, we cannot but perceive that there is also an element derived from the mind's own order of consciousness, to which man has come to have an organic relation. In them we again body forth the spiritual law in the form of a sympathetic relationship with all created things, and discern that the emotional element in mind has risen to its highest point, and similarly to the perceptive faculty, realized itself to be in harmonic concord with the universe.

But it is asserted that in Nature man is able to find the full satisfaction of his spiritual being, and that knowledge and art, together with morality, form a three-fold religious view of the universe relatively to a material order, either directly apprehended from Nature, or mediately experienced through the relations of society.

We are told that in knowing Nature, we precisely to the same extent know God, and that in the knowledge of God so realized we rejoice with a joy unspeakable. And this, with a due definition of terms, is very true; but it is not true if Nature be understood to mean no more than the totality of material conditions, and God be but another name for

the physical order. Nature, so understood, is a system of changing relations bound together and conserved in an order of interdependent organizations by the persistence of the primary organization of the universe, which existed before change began, and remains throughout change, giving order to every change. And God, as known through this conception of Nature, can only be either another name for the order of the universe, or a personification of the power which is manifested by this order relatively to life in the law of the protoplasmic evolution. But what is the order of the universe? It lies behind evolution, and we only know it as manifested in the conservation of energy. Is God, then, another conception of energy? And if so, how, if this conception of God be not an empty conception, do we through Nature arrive at it? Do we enter into contact with God through natural selection? Manifestly, He is in relationship with us through our sympathetic union with Nature, for it is by virtue of the law of sympathy, as manifested in the love of knowledge, that we unfold to ourselves all the wonderful order and symmetry of Nature, and rejoice in every new perception of its unity and harmony. But how can a God, whom we only know from the physical order, so enter into relationship with us? What connection is there between material conditions and the pure, sympathetic motion that impels us to search for knowledge? In many unexpected ways we certainly find that the knowledge we acquire is of service to our natural needs; but this lower satisfaction, which is all that ministers to the utilitarian ends of society, is not the law of sympathy as seen in our love of knowledge. Nor does it inspire it, for then we should love knowledge only so far as knowledge is useful. It is very true, as the eminent Pasteur said, that when a scientific mind finds its investigations to be of utility to mankind, an interest and an ardour are felt in their pursuit which were not felt before; but this is not because of their intrinsic material worth, but because of the sympathy—pure, unselfish sympathy—with one's own kind which then becomes conjoined with the intellectual love of knowledge; and had there not been the original impulse to investigate, born of the pure love of

knowledge, there would never have been acquired the knowledge requisite to discern the utility.

But shall we say that we derive the love of knowledge from material conditions mediately through the sympathies generated by the social bond? If the social organism gives us the inspiring motive, and fills us with sympathies that manifest themselves in the love of knowledge, it can only do so in so far as it contains a principle not derived from the utilitarian sphere. But the utilitarian sphere of the social organism is contemporaneous with the physical order. It reaches to the very boundary of the material relations with which man can enter into correspondence; and whatever lies beyond utilitarian ends lies also beyond the physical order. Whatever, therefore, in the social organism is not utilitarian cannot be derived from material conditions; and as the love of knowledge is not in itself utilitarian, the position that it is derived from material conditions mediately through the social bond contains its own refutation. Only on the supposition that the social organism gives expression to needs of man other than what are bound by material conditions can it yield the sympathetic motions that lead to the pursuit of knowledge. And this implies that the God Who is found to be in Nature acts mediately through the social organism on man because He is in contact with man in other ways than through Nature materialistically conceived. In other words, that He acts on man mediately through the social organism only because He is immediately in man.

God is, indeed, in Nature as externally conceived. Never let us lose hold of the truth of the Divine Immanence; but it is only because God is also in man, in an altogether different mode of manifestation, that man is able to find God in Nature. And the God man finds in Nature is not a materialistic god, but the God whose Divine effluence is in the human spirit. What conception can we form of a materialistic god? We must deny to such a god both intelligence and emotion, and rob him of the very sympathy that makes us one with Nature. And to conceive that there is no intelligence that beholds Nature except our own, to know of no delight in its unity

and order but what we reflect upon it, to feel that there is no sympathetic motion through it answering to the sympathy that goes forth towards it from ourselves, and yet, at the same time, to talk in rapturous language about a god in Nature, with regard to whom our love of knowledge takes the form of a religion, is not all this to carry out into serious life the babbling fancies of childhood that talks and makes friends with its toys?

And as in the love of knowledge the interpretative power of his mind carries man beyond the material order of Nature, so does it also in the pursuit of art. There are certainly no greater helps to sweeten life than the melody and harmony of sounds, the music of verse, and the portraiture of Nature, in her manifold moods and charms; but the artist sings or paints because of his own supreme satisfaction and delight in his art, and not because of the utilitarian aspects which it presents. And to find art in Nature cannot mean anything else than that there is recognised a capacity in man (not as a member of the social organism, observe, but as an independent and individual corpuscular unit) to feel pleasure and satisfaction in Nature. But the pleasure and satisfaction derived from natural objects touches only the realistic side of man's emotional activity—the imitative, and not the creative sphere of his art. And when the imagination "bodies forth the forms of things unknown"; when we picture "the gleam, the light that never was on sea or land"; when the æsthetic sentiment united to the intellect and morality floods the mind with feelings of joy or sadness, ecstasy or woe, fills it with enthusiasm or unnerves it with despair, inspires it with love and adoration, or chastens it into humility and submission, do we not behold functions of art far above all suggestion of the physical order? Moreover, Art, as exercised on Nature alone, can never be more than self-absorption in the perceptivity of the beautiful. Take away from the artist his intellectual and moral perceptions, and his end becomes the immediate pleasure. He is then at play, and not at work. And if art be religion, it is only in so far as the artist is religious. Religion is not the robe of the artist; but rather the art of the artist is the handmaid of religion, and is

employed by her to clothe with delight the exalted conceptions of the soul.

§ 6. *Inquiry whether Morality be independent of the Physical Order.*

We next come to enquire if morality transcend the sphere of the physical order.

That moral conceptions contain positive elements is unquestionable; but the argument with regard to these conceptions turns principally upon their universality and necessity. That they are positive proves nothing, if morality be only an adjustment to the present order of things, and moral truths be not eternal.

It is well-known that in every civilised community a sharp distinction is made between right and wrong in matters of conduct; and, although there are various hypotheses with regard to the principles on which the distinction is made, there is, nevertheless, a general consensus of opinion with regard to the characteristics of good and bad conduct. All views of conduct agree in upholding as virtues, truthfulness, purity, and benevolence, and condemning as vices, falsehood, unchastity, and avarice. And from the point of view of evolution, this agreement of opinion indicates that adherence to virtue and avoidance of vice, in these respects, is necessary in order that a man may be in adjustment to his conditions. From the evolution teaching, therefore, we infer that a moral law prevails; and the point to be determined is whether, similarly to his love of knowledge and his æsthetic sentiment, the morality of man carry him beyond the sphere of the physical order, or whether it be but an adjustment to the relations of that order.

Now, except perhaps in the lower and mental degrees of prudence and courage, the physical order can only affect the conduct of man mediately through the social organism. And the social organism, so far as it is under the constraint of physical order, takes the form of an adaptative feature. To account, therefore, for conduct in its higher and moral aspects as due to the physical order, we must hold that



morality merely marks and conserves the state of adjustment to the physical order in matters of conduct at which the social organism has arrived. That is, morality must be held to be a conservative factor in the social organism, in exactly the same way as pleasures and pains and instincts are conservative factors in animal life. And from this it follows that it may conceivably at some future time, or even at present, be out of harmony with the demands of life.

But if this be so, and morality have no prevision of the future, how can we implicitly trust in our present moral perceptions? Are we not placed at the mercy of any subtle theorist who may make it plausible that a given state of the social organism necessitates a departure from the normal moral standpoint? And is this not precisely what is done by the dynamitard and the nihilist when they represent the political organ to be so far deranged that any means are justifiable to rectify the wrong? And yet we say to these, "Thou shalt do no murder." We require their allegiance to the law that the system of morality, as at present evolved, must be obeyed at all costs and all hazards. But how can we make this requirement if our present morality be no more than a factor conservative of present adjustments? Again, in educating our children we inculcate in them the love of truth, and teach them that the truth must be adhered to, even when it entails loss of possessions and, possibly, of life. But if morality be merely a conservative adjustment, may it not be that we are thus biassing their moral nature, and preparing them to similarly bias that of their descendants, in a direction which may one day be found not to be in accordance with the conditions of life?

If the moral law be but a conservative factor in the social organism, there can be no justification for the procedure whereby we seize upon a moral rule, and insist upon applying it in every case where the line of conduct it specifies is applicable. If morality admit of change in any degree, we cannot take the maxim "Speak the truth" to mean "Speak the truth always." The tendency of the mind to elevate the moral law as something which ought to be observed under all circumstances

and conditions, can only be justified on the ground that there is an unchangeable moral order of relations to which the moral law applies. If my love of truth is to justify me in dying for the truth, it can only be because truthfulness is a necessary and universal relation, which I cannot break without ceasing to be a moral being.

Let us say, however, that we can admit the defects of our present morality, and rely on the order of evolution not to involve us in utter perplexity; that, despite the revolutionary epochs only too frequent in human history, permanent changes in the social organism are so gradual that moral relations which become disadvantageous, become so slowly aborted, as it were, that no friction is, or can be, felt as others better fitted to new conditions arise to take their place. But would not thus to rely on the order of evolution virtually read into it a true morality, and necessarily pre-suppose harmonious relations to prevail between the mind and the universe? And if by the universe we are to understand nothing more than the material order, how can this be? If our present morality has been evolved, and exists as adjusting the members of the social organism to the demands of the corporate life, and if the future demands on the individual entail no violent disruption in the state of moral adjustment in the social organism, our present morality must be no illusory phenomenon, but rather a real approximation to the order of the universe as mediately represented through the social bond; and there must be an essential harmony between the moral ideals of men and the universe, in which these ideals find a place as tentative adjustments of the social organism. Yet our moral ideals, as we saw at the close of the last chapter, are at war with the materialistic conception of the universe. They repudiate its unspirituality. They refuse to accept its criterion of the actually existent. They scorn its disregard for the pain and sorrow of mankind; and they boldly lay claim that the order of evolution must correspond to sympathies and aspirations which have no place in the material order of things.

But, it may be rejoined, our moral ideals have no right to exalt themselves as the sovereign judge of the order of the

universe. They are mere variations, it may be said—tentative flights of the mind ; and not unless established by the selective law, in which case they cease to be ideals and become adjustments, do they become part of the true morality which derives from the order of evolution its authority to rule in the social organism.

Do moral ideals, then, like animal organisms, struggle for existence? We should have thought the world understocked rather than overstocked with moral ideals. To put the matter, however, in another way—is no moral ideal of any value unless it is persistent, and eventually becomes the property of the community? If so, what are we to make of the conscience? The building up of a moral law in society largely depends upon the moral sense of the individuals constituting the society; and, although the conscience is not directed to what is right or wrong in itself, but to what appears to be so to the individual, an enlightened conscience is our only guide in matters of conduct. And how can it be a guide if the ultimate criterion of what is right or wrong in conduct be the community acting, not through the conscience on a sphere of moral relations, but, independently of all reference to the conscience, as the expression of the physical order? Are we to dissociate the moral movements that find expression through the consciences of individuals from the moral ideals of men? And are we to regard it as a disease of the conscience if a sense of obligation be felt otherwise than as authorized by the utilitarian demands of the social organism? If so, we can no longer boast of ourselves as possessing an inward criterion of the character of an act, and have no right to speak of our moral adjustments as a true morality. And yet we have agreed to conclude that the order of evolution does furnish us with a true morality.

Precisely so, at this point our objectors interject. But your reasoning is vicious. No one denies that the conscience is a guide in matters of conduct, or refuses to admit that moral ideals, which arise out of the evolutionary morality and must therefore have some community of nature with it, are valuable.

Both are sources of established moral truths. But it is a delusion to imagine that because, like the madrepores, they build the rock on which they live, they can therefore carry it to the skies. Morality has no meaning except as related to the social organism, and no moral ideal ought to be protruded beyond the concerns of the community. They have in these their fitness and their sphere, and not in the universe at large. And to ask the universe to answer the demands of visionary moral ideals, is as irrational and as absurd as for the coral insect to expect to build in air. Your reasoning is vicious, we say; and it began viciously. The morality of the order of evolution is in no sense an approximation to the true order of the universe, which is absolutely indifferent to morality *per se*. Moral bonds happen to be the bonds of the social organism. Without them, the social organism would disintegrate itself, and civilized man disappear from the earth. That is all. The universe would suffer no loss.

What then, pray, is the social organism, as expressive only of physical conditions, that it should draw out towards it the emotions of the human race? What enthusiasm can be felt for a humanity that has its enthusiasm thus remorselessly crushed? What teacher, who as the conditions of life are being changed, seizes hold of the moral principle which is required to fit the social organism to its new environment, could ever find either in society or in humanity the inspiration to enable him to endure the inevitable persecution that would follow his teaching, on the part of those whose equilibrium of life he disturbs, if behind the social organism and humanity there work nothing more than the cold material order that will one day bring to nought both society and man? Is there any place in the religion of humanity for the man who dies for an ideal that may never live, and which, if it lives, cannot add one day to the life of the social organism, beyond what the sun's heat has ordained for the life of the earth? And where is the morality that, in the social organism considered as the expression of material conditions, can be emancipated from the creeds? Emancipate whatever there may be. And what will it teach? Let us eat and drink, for to-morrow we die.

### § 7. *Morality and the Sympathetic Law.*

These considerations, we hope, are sufficient to show the difficulties in the way of explaining the morality of man in accordance with the physical order. And if they do not appear to be wholly satisfactory, we can only point out how futile it is, after all, to seek to show that morality transcends the demands of the social organism. The social organism is itself an organ of the spirit of man; and must include within its laws of vitality and health whatever is necessary to the general well-being of spiritual beings. The history of civilization is the history of spiritual influences elevating man above the plane of the brute creation, and emancipating him from the material order by enabling him to control it. And it is even probably true that only through the action of the social bond, as conserved by the religious sentiment, does true morality live and grow. The very law of spiritual being is one which binds a man to his fellow-men. And only when we free ourselves from the view of the social organism as exclusively the expression of physical conditions, and take an independent account of the general moral tendencies which prevail in human societies, do we discern their clear emancipation from all control by the physical order.

The bond of human society is in human sympathies. And the evolution of sympathy, like that of all other things, has been gradual and progressive. Its first beginnings were probably akin to the gregarious instinct which leads the lower animals to act in concert for their mutual needs and protection; and it was doubtless, originally, though of the nature of a conservative mental element, strictly an adaptation whereby the struggle for existence was maintained. Its growth, however, was secured, and its power increased, as a conservative factor in life-development, by the care of animals for their offspring; and probably in the immediate progenitors of man, as to-day in the monkey-tribes, by solicitude for the weak and sickly. The evolution of man, demanding a prolonged stage of infancy, demanded also a wider exercise of the sympathetic instinct;



and the evolution of human societies, by drawing individuals closer together, gave again a greater range to the sympathetic bond in the evolution of the feeling which represented the pain endured by another as a pain inflicted upon one's self.

Up to this stage the evolution of sympathy may be regarded as not extending beyond the range of physical conditions, and the utilitarian demands of life. But in this, and in the higher stage in which the manifestations of mind rise to the order of the sentiments, the sympathetic bond of society becomes transformed into the moral perception of the general law of sympathetic relationship, under which is evolved all that is spiritual in man. And in the moral sentiments, which cause the sympathetic law to be reflected upon the personal sphere of the emotions, in the form of an accusing conscience, we realize the existence of a law to which our lives must be accordant. The true, the right, and the good are moral aspirations, governed by the sympathetic law of man's spiritual being. And as it impels the mind to the realization of truth, righteousness, and goodness, the sympathetic law in man endeavours to establish itself as the absolute law of existence, and places itself in diametric opposition to the lower law of natural selection. It opposes and replaces the harsher law which prevails in the lower planes of evolution, where each life-form struggled for itself, and where Nature produced indifferently the harmless and timid herbaceous mammal, and the carnivore red in tooth and claw. In the struggle for existence under the selective law, each life-form is of necessity selfish. An organism or an interest inimical to another and more powerful organism or interest is ruthlessly swept away. But man rises above this selfish plane. And the sympathetic law of his being will not allow him to give full sway to the lower law of self-preservation. Men endanger their own lives to save the lives of others. They are capable of self-sacrifice for an ideal. They protect the weak and helpless, and repel with scorn the suggestion that for the welfare of society these should be allowed to perish. It may indeed be true that the power of sympathy has been called out by means of the social bond; but the fact remains, inexplicable on utilitarian

grounds, that in human society the law of natural selection gives place to the operation and the observance of a new law—the law of sympathetic relationship.

§ 8. *The Interpretation of the Spiritual Evolution.*

Man has in materialism no sanction for his sympathetic attitude with regard to the universe. Materialism, on the contrary, would constrain him to pursue knowledge only so far as knowledge ministers to human needs, to enjoy beauty merely as a solace for care and a sweetening influence of life, and to follow after morality only as involved in the utilitarian demands of the social organism. Under material conditions there is no law but that of natural selection, and no sphere of mental activity but what is in conformity with the survival of the fittest. There are no such things as the love of knowledge for its own sake, beauty without reference to human needs, or morality outside of the utilitarian sphere. And if pursuing knowledge without the true love of it man never attains to the knowledge of the unknown useful, if seeking to enjoy beauty for a selfish end he misses the true charm of it, if regarding morality as ministering to the social organism he weakens the force of moral distinctions; no matter, says materialism, so let it be. The physical order so rules it. For materialism knows not the law that constrained a Kepler to search so unweariedly for the laws of the planets; a Millet to live in distress and obscurity, and paint his Angelus; a Latimer to cry to a Ridley, "Be of good comfort, Master Ridley, and play the man." The sanction for these lies beyond the physical order.

The love of knowledge is the outgrowth of a mind depending for its manifestations upon a nervous organization, which has been continuously brought by natural selection into higher degrees of adjustment to the conditions of life; but this does not rob it of its inspiring power to lead man on to the investigation of the universe. The æsthetic sentiment is developed from the mind's interpretation of its affection by the organs of sense, and these organs, adapted to the sphere of outward relations, have come to convey pleasure to the

mind by association with wholesome exercise; but these do not destroy the significance of the æsthetic sentiment as a realization of an harmonic concord with Nature. The sympathetic relations of the social units had their rise in the gregarious instinct of the lower animals, and have been developed in accordance with the needs of the social organism; but neither do these destroy the fact that man by means of his developed sympathies finds Nature and mankind full of sympathetic motions, and united to his spirit by indissoluble bonds. And the moral sense has, without doubt, arisen from the need of ordering the conduct so as to preserve inviolate the relations of the individual to the community; but this does not weaken the fact that man has come to realise a moral law, with which his life must be in accordance.

When we behold the wondrous order of the universe, when we are stirred by the emotions of the grand and the beautiful, when we glow with the generous humanity which holds all life sacred, when we reach out towards the attainment of exalted moral ideals, then we are no longer life-forms bound by the selective law, but chords quiring in harmony with the Great Being who occupies in the world of spirit the place which the physical order occupies in the lower world of matter. Man, by the sympathetic law, is carried forward to the realization of his nature as spiritual, and as a reflection of the Divine. There is no love of knowledge for its own sake, no genuine appreciation of beauty, no awe of the sublime, no moral rectitude of character, no earnestness of moral purpose, no generous feeling for mankind, no self-sacrificing love, no deep sense of the mystery of existence, no reaching out towards the High and Holy One, but is an incarnation of spiritual being. And the law of sympathetic relationship shown in each of these emotions of the human soul has no place under material conditions. By the very virtue of the realization of any one of them we transcend the sphere of the physical, and are carried forward into the spiritual. Our life goes out from us, and we are drawn into sympathetic relationship with all created things. Our spirit stretches out towards a Great World Love that we feel to pulsate through

the universe. Union with This is the true concord of our being. Participation in the Glory of This is the purpose to the realization of which evolution moves, and towards which it throws out anticipations in the pleasurable feeling of life, the delight in knowledge, the joy in beauty, and the sympathetic affection of man for man.

We trace in the order of mind the operation of a spiritual law, which becomes clearly manifest in the spiritual order of evolution, as the law of sympathetic relationship. In the spiritual order, the love of knowledge, the æsthetic sentiment and morality, all transcend the material sphere of things; and these, together with religion, form the root-properties of a fourth order of evolution under their own appropriate law. It is difficult, indeed, to mark off a clear line of distinction between mind and spirit. Many birds possess an æsthetic sense. And monkeys are probably not without some glimmerings of morality: a mother, watching young monkeys at play, has been seen to run down from a tree and chastise her young one when the spirit of its play had passed into savagery. The brute-creation may, indeed, be nearer to us than we in our self-complacency imagine. Mind has slowly realized itself in the universe. And if man is cognisant of the spiritual law, and therefore a responsible agent, this appears to be entirely due to the fact that mind in man is freed from the trammels of sense and becomes regulated by its own law. We may, perhaps, regard the connection between mind and spirit as analogous to that between matter and life. As life may be regarded as dynamic matter, so may spirit be looked upon as free mind. And though we may not be able to contrast the root-properties of spirit with those of mind as sharply and decidedly as we contrasted those of life and matter, we may from the spiritual law of man's being realize that the distinction between them is real and true. The spiritual law occupies the third of the three spheres in which we have antecedently surmised that the law of the evolution in any order is to be found.<sup>1</sup> The sphere of energy is the sphere of the root-properties of matter;

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<sup>1</sup> See chap. iii. § 7, p. 66.

and in matter the law of the evolution may be said to reside in the root-properties themselves. In life, the law of the evolution resides in the external circumstances of the root-properties. And the law of the evolution of life prevails in the evolution of mind until mind becomes free. During the evolution of mind, however, there has been gradually prepared the sphere of the law of the spiritual order. As mind slowly realized itself and became more and more conscious of the relations of the universe, it at the same time entered into closer bonds of union with the external universe; so that eventually, when the universe was realized as an object of thought and as the sphere of the mind's own pleasurable activity, and when man knew that there were other men who were his fellows, and spirit looked out from Nature unto God, a connection was established between mind and the universe, and between mind and the Unseen, which gave to a new order of relations the law of their evolution. This law we recognize as the law of sympathetic relationship, prevailing not only in the relations of the spiritual order to the universe, but also in the relations of the spiritual to the Unseen. For this law there is no place in the physical order of things; and to interpret its significance we must conclude the order of evolution to be directed to the fulfilment of the Purposes of an Evolver. And the elements of the spiritual in man severally indicate the Purposes which are being fulfilled. The love of knowledge points to the delight of knowing the Eternal and rejoicing in His Excellences; the æsthetic sentiment to the satisfaction of beholding the order, arrangement, exquisiteness, and grandeur of His Works; the moral to the joy of sharing in His Truth, Righteousness, Holiness, and Goodness; and the religious to the rapture of adoration and love to be experienced in His Presence.

With no uncertain voice, evolution bids man look beyond the material world to the spiritual. While the material is everywhere changing around him, man is carried forward into the Unseen; and by virtue of the law of sympathetic relationship realizes his position as undying spirit. And, though he may speculate upon the Divine spark attaining steadiness to



outlive its connection with matter,<sup>1</sup> it is really from the surety of his position in evolution, slowly attained upon the earth, that he derives his assurance of immortality. Working in matter, transferring itself to the energy of protoplasm, manifesting itself in the order of mind, developing through mind the conscious realization of the universe, and informing man with a spirit that draws him outside of himself into harmonic concord with all things, a Purpose prevails in the universe and opens out to us, amid the enigmas of life, the glory of what shall be when evolution has perfected its course.

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<sup>1</sup> JOHN FISKE, *Man's Destiny*, p. 110.

## CHAPTER IX.

### THE INTERPRETATION OF THE UNIVERSE

#### § 1. *The Error of Materialism.*

MATERIALISTIC optics can never discern the things of the spirit. And when we are told by materialistic thinkers, that "no declaration of the hopes and attributes of humanity, which demands a higher sanction than that of the human understanding, receives the assent, though it is spared the denial, of persons averagely educated, and who are bold enough to think for themselves,"<sup>1</sup> we are not surprised to find that no spiritual truths are assented to.

With such a basis of assent, however, we should cordially agree if we were permitted to interpret in a rational manner what the sanction of the human understanding is. It is a basis of assent which is worthy of acceptance by every mind. But we cannot accept it, when by a materialist we are asked to narrow down the office of the understanding, so that its sphere admits of nothing but what comes within the range of concepts that can be verified by the senses. Such a view of the office of the understanding is attained only by the sacrifice of truth and the suicide of the understanding itself.

Materialism limits the office of the understanding to the things of sense; but at the same time it claims for the things of sense the nature of ultimate truths. Matter, motion, and evolution are its ultimate facts. But of evolution it discerns nothing more than the physical processes; and commits itself to the opinion that the manifestations of mind are altogether material products. It sees no law, no order, which is distinctive

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<sup>1</sup> R. H. EYTON, *Westminster Review*, July and October, 1872, p. 445.

of mind; but refers everything to the law and operation of the physical order. And the place in evolution of the higher attributes of man—the conscious joy of existence, the realization of the universe as an object of thought, the pure love of knowledge, the æsthetic sentiment, morality and religion—it blankly ignores.<sup>1</sup>

The error of materialism, as an interpretation of the universe, is that it gives exclusive attention to the deduction from the physical law of the universe, and disregards the deduction from the sympathetic.

When our minds are fixed upon the physical law, we recognise a power universal, unchanging, and all-compelling. There is a physical energy which pulsates perpetually and unweariedly throughout the universe, and which is the life-blood of the whole economy of Nature. It wins our admiration, and we behold it with delight. How wonderfully precise it is in all its operations; and in what singularity of detail its manifestations occur! Nothing in Nature is free from its influence. It binds the worlds into one, and guides a raindrop to the earth. It shoots from a distant star, and trembles on a blade of grass. It compels the rush of vapours from the sun, and controls the gentle dropping of the dew. It rocks the heavens with its thunder, and plays with a slender needle. It devastates a forest with the fury of its fire, and slowly disintegrates a fallen leaf.

Wherever matter is, energy reigns. The wonders of the plant and animal kingdoms are only so many illustrations of the subtlety and delicacy of its operations, and of the order and adjustment which it establishes. And even when mind comes into the universe, its manifestations are such as are in

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<sup>1</sup> We may note, however, that the materialistic conception of consciousness as an accompaniment only of physical processes, without the power of modifying the action of the brain, dematerializes the spiritual, in the common acceptation of the terms, much more than we have ventured to do. It makes the enigmatical character of consciousness more enigmatical still. And in answer to the query, Why does consciousness occur at all in the evolution sphere of things? it can make no reply which excludes the view that consciousness is a direct manifestation of the Divine, a ray flashed from the Glory of God on the manifestations of His Power.

accordance with the physical conditions which the operations of energy establish. Pleasures and pains are attached to wholesome or harmful activities by selective influences. Instincts and orders of intelligence are conditioned by the physical order, and fitted to the position of animal life relatively to physical processes. Mind, in its evolution up to the self-consciousness of man, never oversteps the boundary which natural selection imposes upon its horizon; and the form and functions of the social organism, whose units are self-conscious men, have, in a great measure, grown to maturity under the conditions of natural law.

But, however universal and potent it be in its operations, this physical energy is, nevertheless, the servant of man. It is a power which man can understand, and which, in proportion as he understands it, becomes his servant, his slave, his genius of the ring.

And the means whereby Nature becomes the servant of man are the spiritual attributes of man which, evolved under the ministry of the physical order, free him from servitude to the material law, and bind him to the higher law of sympathetic relationship. Without the higher qualities of mind which are manifested in the spiritual order, man's mental life could never have arisen above the plane which is limited by the adoption of conservative positions. It is only when the self-conscious mind enters into sympathetic relationship with created things that it discerns the limitations of the physical order, and controls its powers. Only through his love of knowledge does man attain to the recognition of the unknown useful. Only through the exercise of his æsthetic sentiment does he experience the ameliorating and sweetening influences of Nature. Only by reaching out towards high moral ideals does he give to society the spiritual energy which enables it to continue in health and vigour. And only as he recognises the obligations of religion does he unify and conserve this higher life.

And for these spiritual attributes of man there is no place in the material order of things. To interpret them, we must look beyond the physical order, to the God who is the Source of both matter and spirit.

## § 2. *The Testimony of the Spiritual Order to God.*

The law of sympathetic relationship involves the union of the spiritual with the Divine; and the doctrine of the Divine Immanence has for its true witness the existence of this law. The sympathetic law moves the human personality outside itself into sympathetic relationship with all created things, and our sympathetic union with Nature proves Nature's union with the Divine. The glow of communion with the universe, and the rapture we feel on unfolding its relations, are evidences that by means of it the spirit of man comes into contact with the Divine. Nature we feel to be not a cold emanation from the Will of God, but a living manifestation of His Presence; and in proportion as through the love of knowledge we attain to the knowledge of Nature, we attain to the knowledge of the Ways of God. As we unfold the wonderful order and harmony of the universe, so we in measure unfold the embodied thoughts of God. And as Nature is to us full of emotional significance, so are our delight in its forms of beauty, and our awe at its aspects of the sublime, reflections of the pleasure of God in His works.

The sympathetic accord between Nature and the intellectual and æsthetic attributes of man proves the Divine Immanence; and, taken alone, might perhaps incline the mind to pantheism. The sympathetic law, however, as manifested in morality, carries us further to the recognition of the Truthfulness, Righteousness, Holiness, and Goodness of God. Moral relations are eternal; and truthfulness with its reflex upon others in the form of justice, righteousness with its incapacity of wrong-doing, holiness with its aversion to evil in every form, and goodness with its beneficent wisdom and protecting love, as attributes of spiritual being, are all to be transferred from man to God. They are reflections of the Divine image in man, and by the very fact of their presence however imperfectly in man, their presence in God is known.

But having ascribed them to God directly from the testimony of our own spiritual nature, our eyes become open to behold them manifested in the universe. The Truthfulness of God



gives to the universe its unvarying law: the uniformity of Nature is the material aspect of Divine Truth;<sup>1</sup> and what is manifested to us once, is manifested to us always under the like circumstances and conditions. Righteousness is manifested in the conditions which ensure the moral progress of man: history teaches us that wrong-doing usually leads to decay and death; and men who have not recognised the full conception of a Personal God, yet speak of a power that makes for righteousness. Holiness is seen in the veiled face of God towards those who follow not the sympathetic law. And Goodness, though incompletely manifested here, is yet evidenced in the laws of the order of evolution. The very contention of those who disbelieve in God, that life has fair compensations that render existence endurable, is evidence in itself of the Goodness of God. We cannot indeed, so far as we have at present considered the matter, reconcile the suffering and grief, and the wrong and evil, we experience, with the idea of perfect goodness as manifested in the visible order of things; but we do see that in love to His creatures, God has made the one not to be without compensations, and the other not to be without consolations. He gives us a foretaste of spiritual joys; and, in endowing us with spiritual attributes, has made us capable of bearing our earthly lot. His Blessings have been poured out on His creatures with a liberal hand. Everything that feels, rejoices in its life; and if pain exists in all things animated, its intensity varies with the degree of power to feel. Even man, who experiences most pain, and who is most conscious of the incompleteness of life (if, indeed, he be not the only creature so conscious), is so richly blessed by the Goodness of God that many men are indifferent to their true relation to Him.

Finally, religion draws God near to the human soul. In the love of knowledge we have the proof of our spiritual nature, in the æsthetic sentiment a witness to our spiritual vitality, and in morality the revelation of our relations to the spiritual order; but it is in religion that the spiritual in man claims as

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<sup>1</sup> See chap. xii § 1.

its birthright the knowledge of God, and participation in the glories of His Kingdom.

The sense that there is a Divine Spiritual Something, responding to what in ourselves is spiritual, is native to us.

But like all things born in time, this sense has had perforce to learn by slow degrees to rightly distinguish its Object. It recognises God, indeed; but has required to be taught the Ways of God. At first vague and unformed, dimly conscious of its Object, it confused the sensible with the Divine, the material with the spiritual. And the scales of illusion have fallen from it, only as man has increasingly apprehended the spiritual law of his being, and discerned the true import of his spiritual attributes. The sensible partakes in a degree of the Divine, and the material of the spiritual; but it requires a developed spirituality to discern the spiritual significance of sensible and material things; and only through the conscious realization of the sympathetic law is there descried the spiritual kingdom in which the God, whom we find in Nature, is present with us as our Guide and Counsellor to an unseen goal of peace and happiness and perfect well-being.

All religion is an apprehension of God. Wherever true sympathy is, there is true communion with God. And the point of supreme importance is that man feels and knows his being to be bound to the Divine Personality of God. This he attains by virtue of his own inherent spiritual attributes. And if he beholds in Nature the God his spirit tells him of, it is because he feels Nature also to be of God. And this feeling is true, though it be uninformed of the mode and manner of Nature's relation to God, and must be taught and tutored by wider knowledge to interpret aright the spiritual significance of outward things.

### § 3. *The Want of Finality in Religion.*

God reveals Himself to us in His relation to the universe in proportion to the depth and clearness of our knowledge of the universe. And only as we attain to a clearer vision of the spiritual kingdom by intellectual, æsthetic, and moral progress, do we free ourselves from spiritual illusions. In truth, man

has learned the Ways of God in the same gradual way, and by the same extension of his powers, as a child learns the life of the world. The first age of childhood, with its exuberant and unchecked fancies, has a correspondence with the first ages of man in which Nature was personified, and every wood, stream, and hill became the abode of genii and directing spirits. And as the experiences of life modify the fancies of a child, so they also played their part in modifying the first crude attempts at a natural theology; and, a general idea of the passivity of Nature taking the place of the previous animism, God, or something recognised as God, became the agent of every change, and the disposer of all events. Then, as in a more matured condition of mind the conceptive faculty comes in as a determining cause in matters of belief to the growing child, so in the evolution of man's knowledge of the Ways of God the reign of the practical understanding is seen in the endeavour to shape a religious philosophy, which rested upon individual and concrete grounds, such as signs of beneficence and proofs of design. Finally, with the age of reason, as the child, become a man, ceases to think as a child, so have we the stage in natural theology when men begin to co-ordinate their conceptions, and to interpret the universe in the light of their accumulated stores of knowledge.

Man has slowly learned the relation of God to the universe, and in the process of his learning he has repeatedly harboured mistaken views. An infant state of society placed God on the inaccessible hills, or identified Him with Nature, and imagined the disembodied soul to wander in the gloomy hall of Hades. Then, with increase of knowledge, these gave place to the opinions that God dwelt in the regions of stellar space, and that the home of the dead was in the stars. And knowledge still increasing, man has at last learned that he cannot with bodily eyes descry the spiritual and Divine. Shut up in space of three dimensions, able only to speculatively construct systems of manifoldnesses beyond it, our knowledge is limited to what comes under the rigid law of the evolution of three dimensional relations of space in the relation of time; and if from these we rise to the thought and knowledge of

God, such thought and knowledge are symbols only of the Divine Reality. For every incoming of the Divine into our sphere of cognition must, to be known, take upon itself the conditions of our life and development; we can never *feel* the touch of an angel's hand.

And there are many who, observing this want of finality in the religious interpretations of the universe, would rob religion of its intuition of God. Because with all its seeing it discerns only "broken lights" of the Divine, they declare it can know naught of God, and that its proper office is to be found in the material and sensible. Thus they shut their eyes to its true nature; and, classing it among the changing phenomena of time, they seek to explain it in accordance with the things of time.

But we can, by no hypothesis, account for religion as belonging exclusively to the present sphere of things.

To find the ultimate root of religion, we may examine all religions, and take out the principle common to all as expressive of the root; but it is questionable if such a method of procedure can yield a trustworthy result. Degeneracy as well as development is present in the spiritual as well as in the material evolution; and an originally high sanction for religious beliefs may have disappeared in unprogressive communities. And even if dreams be considered as evolving religious ideas, by suggesting the idea of a second self, and by leading to the belief in ghosts of the dead, there still remains the difficulty that when dreams were known as dreams, and the belief in ghosts became a superstition, the religious conceptions which had been evolved did not disappear with them, but had become established on other sanctions.

And if confusing religious with philosophic thought we seek for the ultimate sanction of all religion in the sense of a mystery that surrounds our lives, we incur the danger of taking from it all that gives it power over the minds of men. Whatever foundation it may have in the sense of mystery, it is certain that as an operative factor in society religion is the expression of the moral earnestness of mankind, reaching out towards a Supreme Disposer for that sanction of law and conduct which cannot be found in mundane things.

All moral earnestness rises into religion, and definite forms of religious worship begin when there are laws and morals which need conservation. Behind the belief in ghosts, ancestor worship, and the personification of the powers of Nature (if such can be held to be the beginning of religious observances), lay the dim consciousness that conduct was to be brought into harmony with something outside of the personality. And men propitiated a dead ancestor, or did obeisance to the sun or a river-god, because in some way these were imagined to influence the life, and conduct was thought to be efficacious with regard to them. The idea of duty underlies all religious observances; and not only in the forms of religion, and in religious creeds, are we to look for the permanency of religion, but also in the feeling that conduct is under rule and government.

The earnestness to regulate the conduct led naturally to religious observances; and legal and moral codes asserted themselves to be divine as religious ideas gave substance and shape to the code. Also outside of the professed religious systems, we find in heathen stoicism and epicureanism the same earnestness expressing itself in philosophies that had ceased to be religious only because religion was identified with the *cultus* of the gods. Even in materialism there is an earnestness which, divorced from religious belief, still maintains some elements of religion, when it asserts that life must be guided and governed by a mechanical view of the universe. Positivism also, as is well known, earnestly insists on a religion of humanity, which has an Aaronic priesthood of philosophers and a Sanhedrin of capitalists.

Religion is, in fact, the conservative factor in the social organism, so far as the social organism is the expression of man's attitude towards the spiritual law. It preserves, unifies, and imposes as duties the spiritual obligations which man deserves, and through it we have the interpretation of the universe to the spirit of man.

And though the systems of religious philosophy have given us no sure interpretation of the universe, we cannot overlook the undoubted hold which religion has always had upon



mankind. That the religious sentiment is an integral part of human nature cannot be questioned; and whether it is manifested as reposing reverently on the past, investing it with an ideal halo, and being timidly distrustful of new light, or as reaching out towards new forms of belief, bold in thought, keenly critical, and suspicious of error, we cannot but consider it as bearing testimony to the fact that there is a law working in man which is spiritual and not physical. It is true that much of what passes for religion is mere sensationalism and love of excitement. And not infrequently sources of emotion are tortured to yield a commensurate foundation for religious beliefs. It is also indisputable that the religious sentiment is in some way affected by its social environment, as the bursts of religious frenzy and the waves of indifferentism sufficiently show; and though the Grace of God, or the want of It, is usually brought in to explain these, it is hard to conceive what the Grace of God could have to do with the delusions of the Cathari of the Middle Ages, or the vagaries of early Quakerism, and it is equally hard to conceive why the want of It should be assumed to characterise the many philosophers who have acted in the spirit of Gallio. Yet, on the other hand, it must be remembered that not the morbid and over-strained, but rather the purest and most upright of men have found in religion their chief comfort and consolation; and this trait in their natures cannot be without significance.

Moreover, however mistaken have been our religious interpretations of the universe on the whole, we have made progress in the knowledge of God; and in every stage of the progress there has been a true knowledge of God.

#### § 4. *The Religious View of Nature.*

Contact with God in Nature came with the first sympathetic motion of the human spirit outside itself. And when men, in the childhood of spiritual being, personified the things of sense, they, nevertheless, dimly felt their sympathetic contact with Nature to be an immediate contact with a Personality and Will answering to their own. That Nature was of God they

knew ; but the intellectual clearness of vision, that grows with extended exercise of the sympathetic law in the realm of Nature, was as yet unattained ; and they mistook the garment of the Glory of the Lord for the brightness of His Person. And afterwards, when this first crude conception of God's relation to the universe had died away, and every turn in human events, each disposition of the phenomena of the universe, was ascribed to the direct action of the Deity, man had made a real advance in the knowledge of Nature's relationship with the Divine, though, as yet, he knew not that God acts in Nature by means of laws. Even the idea of God as a beneficent Designer, rightly understood, contained a truth. Men beheld the organic connection of the dispositions of Nature with the God who lived in their own sympathetic motions ; and if they mistook the results of His action through the powers of Nature for the declaration of His Ultimate Purpose, they had, nevertheless, discerned the economy of creation.

In fact, the religious view of God in Nature, depending as it does on the evolution of spiritual relations, and therefore on the formation of relations in the sphere of the consciousness of relations, has been subject to the same order of evolution as prevails in all establishment of relations. And the knowledge of the relation of God to Nature is found to be manifested in various degrees of evolution, accordingly as man has increasingly apprehended with clearer vision the significance of Nature Godward. All that science has done has been to clarify the conception of God in Nature. God has not been removed further from the universe ; but the mode of apprehending Him in the universe has been made more precise. Modes of manifestation that had been thought to be primary have been discovered to be secondary ; and, though increase of knowledge has shown the operation of God in Nature to be seemingly less and less direct, God has been brought nearer to His universe as a whole. Fuller knowledge of the universe has brought truer interpretations of it ; and if we now surrender the argument of design, it is only to replace it by the higher idea of Eternal Purpose — Purpose that points to an immortality

for man, and that doubtlessly fulfils itself in manifold ways with regard to the universe at large.

The only fundamental error which has prevailed in systems of natural theology, and which, wherever it has prevailed, has left open the flood-gates to destructive criticism, is when, forgetful of the basis of religion, men have sought for the very ground of religion in a religious view of the universe. This was the great demerit of Paley's work. Paley sought for the foundation of belief in God in external Nature and not in man. And in a much-admired passage in the concluding chapter of his *Natural Theology*, he tells us:—

“In a *moral view*, I shall not, I think, be contradicted when I say that if one train of thinking be more desirable than another, it is that which regards the phenomena of Nature with a constant reference to a supreme intelligent Author. To have made this the ruling, the habitual sentiment of our minds, is to have laid the foundation of everything which is religious. The world thenceforth becomes a temple, and life itself one continued act of adoration.”

It is, indeed, the highest object of the spirit of man to connect all things with the Father of spirits, and see God everywhere and in all things. But we see God everywhere only by the free motion of our own spiritual being; and Nature to tell of God must first be informed by our religious feelings. Not by viewing Nature by the light of the Deity do we lay “the foundations of everything which is religious.” The foundations of religion are in the sympathetic law of the human spirit; and it is only the projection of the religious activity into Nature that gives to the universe a religious significance.

In our religious view of Nature we lay not the foundations, but build up the structure of our temple of God. And this, according to our means, may be a flimsy erection of wattles and mud; or an open court, free to the heavens, but enclosing a dark and sombre tent which none but the privileged may enter; or a long, withdrawing, columnar, mediæval cathedral, that glorifies its architect and fills the mind with wonder. Such a mediæval cathedral was the temple built by Paley; or rather, more

accurately, Paley filled the earth with a profusion of such temples, so that over all lands tower bore witness to tower, pointing up to God, and in all places the strains of adoration rose within their walls.

These cathedrals, however, now lie mouldering ruins; and no longer in temples, which however grand, yet limited and restrained the mind, do men look up through Nature unto God. The doctrine of evolution has lifted the roof and widened out the columns till there is one vast temple of God as high as the heavens and as wide as the universe. And the music that rolls through it is not only a psalm of adoration, but a myriad-tongued swell of praise and glory and love, that blends in its chorus the echoes of all time. Here is the ground-swell of Nature, and pedal notes rumbling from the far-off time when out of the womb of space the energy of the universe was born. In it are the echoes of rushing tempests of matter, the whirl of worlds, and the song of forming stars. Here, too, is the softer voice from the later birth of the earth, when the proud waves that covered it sank to their deeps, and the rivers murmured from the hills. And there are the notes of new-born life, rising through the lips of the sea from a new manifestation of God; and over the earth, in wondrous rhythmic phrase, herb and tree, flower and seed, hymn the unchanging power of law. There, too, is the song of the dawn new breaking over the earth, the voice of the marching day and whispers of the star-gemmed night. Heralds these of the richer notes that rise from the realm of mind. Then through the ordered earth existence raises her voice, and the glad pæan of pleasure, and the melodious cry of intelligence, ring through time and proclaim the advent of the kingdom of the Lord. Now the notes swell clear and loud above the deeper voice of law; and in prevailing chorus man sings the song of God.

## CHAPTER X.

### THE PROVIDENCE OF GOD

#### § 1. *The Providence of Natural Law.*

**A**LTHOUGH the formal question of the Attributes of God is a philosophical and not an interpretative one, it would probably be thought an omission if in a natural theology no reference were made to the so-called natural Attributes of the Deity. Yet to natural theology these Attributes are not absolute but relative truths; and the most that can be said with regard to them from the interpretative point of view is that they are not contradicted by the evidence of science.

A far more important question than that of the natural Attributes of the Deity, and a question which, if answered in the affirmative, carries with its answer the solution of all questions of practical value with regard to God, is that which is concerned with the existence of an actively operating Providence. And this is distinctly a question for natural theology to answer. If there be a Providence, the question of the Attributes of God is of very minor import. Indeed, the Providence of God proves all His Attributes. Discern a Providence, and we can at once refer all that is in the universe to an Omnipotent, Omniscient, Necessary, Eternal, and Self-existent Being. Deny a Providence, and we are thrown back upon the troublous sea of doubt and the darkness of materialism.

Our investigation of the order of evolution has led to the discernment of a spiritual kingdom realizing itself in the universe; the evidence of which is contained in the realization of a life on the part of man, which transcends the



conditions imposed by the physical order, and which is spiritual and governed by a spiritual law. And the very fact of the evolution of this spiritual kingdom, under the ministry of the physical and protoplasmic laws, proves at the least a Providence of natural law.

The evolution of the universe is in accordance with fixed conditions. And given the root-properties of atomic matter and the original conditions of their evolution, the whole course of the physical evolution is a question of mathematics quite within the range of the mind of man. Also, at a later stage, given the relations subsisting in protoplasm and the condition of the physical universe when protoplasm originated in it, it is not beyond the powers of mind, such as we know them, to forecast, from a knowledge of the order of physical evolution and the mode of its action on protoplasmic life, the whole scope and variety of the evolution of protoplasmic adaptations both in plant and animal life. Thus the physical and protoplasmic worlds, with all that is contained in them, are capable of being represented as the resultants of processes conceivable by intelligence, and subordinated by an Intelligence to laws of the highest generality. And in the existence of these laws, contemplated as subservient to a Divine Purpose, we have an adequate provision for whatever in either world is subservient to the succeeding orders of evolution.

Again, in the evolution order of mind, from the moment that mind dawned on the universe and became conscious of relations, the future evolution of its manifestations, in clearer degrees of consciousness, was assured from the very nature of the related system of which it became conscious; and its ultimate triumph over the forces which exist in the universe, predictable to be only a matter of the time required to gather the adaptative features of the brain, in accordance with the protoplasmic law. And it is consonant with the idea of a Divine Purpose fulfilled in the evolution of a spiritual kingdom, that while the physical and protoplasmic orders are subservient to the order of mind, mind itself in the course of the evolution of its manifestations never oversteps its horizon, but, until able to realize relations

in abstract form, is under the control of the physical order, and has its manifestations strictly conditioned by the circumstances of the time. For if mind had been prophetic, it would then have been removed, so far as it was prophetic, from the action of the conditions of evolution; and the idea of Purpose in evolution would have been inappropriate to the order of Nature.

Furthermore, from the fact that the course of evolution is one of gradual change, we derive the significant conclusion that whatever conditions of equilibration are set up they may, to a greater or less degree, be said to partake of permanency; and that therefore in all manifestations of mind we have, at least to a partial degree, the fulfilment of a Providential arrangement in the existence of creatures endowed with mind and rejoicing in their endowment thereof. Every species of animal life which feels pleasures and pains, and depends for its life upon instincts has, by the very virtue of its existence a reason for its existence, and a pledge in the order of evolution for its continuance, within, of course, certain limits of change.

We thus infer that, relatively to conscious life, there is a Providence of natural law.

But it is evident that such a Providence falls short of what is required by spiritual beings under the sympathetic law of the spiritual kingdom. It is not enough to discern that in the Providence of God the course of evolution should express harmony and order; nor yet that the physical and protoplasmic orders should, through natural law, minister to the order of mind. For this limits the action of the Providence of God to provision for the material welfare of life alone. And such a Providence is exactly that which might be predicated with regard to the *tania serrata*, or any other of the wonderful parasitic forms of life. Relatively to the *tania* we might trace a chain of provisions, arising from natural law, whose successive links would be the rabbit that nibbles the grass on which its eggs are deposited, and in whose stomach it is hatched; the dog or the fox that devours the rabbit, and in whose intestines the *tania* lives and flourishes; and, finally, the

grass upon which it is evacuated in segments, and over which its eggs are scattered to wait until the next rabbit passes by, and nibbling gives it the opportunity to begin anew the cycle of its life.

There must be in view of the spiritual kingdom something more than the Providence of natural law. For the spiritual kingdom, though existing under the conditions of the physical and protoplasmic evolutions, is in its own evolution brought into contact with the Divine; and, though circumstanced by the natural law, it rises above this law, and is by its own law in relationship with spiritual conditions. The Providence demanded by it, therefore, is not only one which exercises itself through natural law, but also one which, in addition, extends to the spiritual sphere, and whose characteristics are in accordance with spiritual needs.

Our spiritual being can only grow by contact with the spiritual. And we realize the dangers and the loss which are incurred in becoming oblivious to the sympathetic law, We also recognise that our spiritual intuitions are but broken lights of the Divine. The knowledge we delight in is fragmentary and imperfect. The beautiful and the sublime, that stir our emotions, are but fringes of the robe of glory that enfolds the universe. The morality we attain to is contaminated by falsehood and vice. And our adoration of the High and Holy One is dimmed by superstitious fancies and self-will. We are disturbed by manifold temptations to wrongdoing, and have many incentives to forgetfulness of God. We are ignorant, and seek for enlightenment; helpless, and we cry for succour. And, in addition to these purely spiritual requirements, we discern that our present sphere of existence is not altogether fitted for our perfect well-being; and that the accidents and mischances of life are neither trivial nor few. Therefore, we lift up feeble hands to God and ask from Him, our Spiritual Father, illumination, guidance, sympathy, and communion.

## § 2. *The Doctrine of Special Providences.*

It is a requirement of spiritual being that God shall hold all things in His hand for ministration to spiritual needs, and also that He be actively operative in the universe in the interests of the spiritual kingdom. And we may offer, as deductions from our interpretative view of the universe, four propositions in proof of the existence of the Providence demanded by these requirements.

First, that the persistence with which the religious mind turns to Nature for communion with the God of Nature, is an indication that the spirit of man sees in Nature an operation of God which is other than materialistic.

Second, that testimony is borne to the reality of this operation by the fact that the protoplasmic and physical orders of evolution are subservient to the order of mind.

Third, that the spiritual order of evolution has interests to conserve which demand it.

Fourth, that such a Providence is a reasonable corollary from the existence of a Divine Purpose, and that the actions of spiritual beings are, on any other hypothesis than that of its existence, meaningless and absurd.

While, however, we advance these propositions, which are, for the most part, re-statements of positions already established, we are not unconscious that the proper proof of the existence of an actively operating Providence ought to be sought for in the history of man, that is, in the history of the spiritual kingdom. But human history is precisely that field of enquiry where the real characteristics of things are the most difficult to discriminate, where opinion takes the place of fact, and where prejudice rules to the exclusion of truth. It would be hopeless to insist upon the testimony of individuals to personal experience of Special Providences, when the public mind does not generally accept such testimony as trustworthy. Moreover, saintly lives have taught us that it is the glory of the saint to be misunderstood of men. And we cannot rely on the testimony of communities, for all nations have claimed to be favoured nations, and none have experienced continuous

favour. And though we might argue in favour of the doctrine of Special Providences from the fact that the revealed religion of God has always marched in the forefront of civilization—Abraham was originally a denizen of one of the four cities of Babylonia; his descendants dwelt in Egypt; the chosen people were located on the great highways of the ancient world, and in immediate proximity to the great maritime cities of Phœnicia; the time of the Christ saw a world prepared for His coming, in the establishment of one mighty empire around the shores of the Mediterranean; and, in later times, the upheaval of men's minds at the Reformation left one branch of the Church Catholic the witness to a pure and apostolic faith, and the nations who acknowledge the name of Christ the foremost in material prosperity, and the civilizers of the world. Yet, with all this, in view of the many extraneous questions which inevitably arise when we trench upon the ground occupied by a revealed religion, we are reluctantly compelled to leave what is beyond doubt the proper field in which to trace the existence of the Providence of God, to the sphere of thought to which, in some respects, it more truly belongs, that of an inquiry into the evidences of a revealed religion.

While, however, we debar ourselves from offering an historical proof of the doctrine of Special Providences, we may nevertheless, in support of the propositions we have advanced, discuss other and supplementary propositions which deal with the external and internal objections to the doctrine. And in the first place, in answer to the external objections arising from the supposed rigidity of the natural law, we may make the rejoinder that, in view of the demands of the spiritual order of evolution, the spiritual kingdom can only be robbed of the doctrine of Special Providences on the clear proof that the order of the universe does not admit of any other manifestation of God than what is manifested in the material order; and in the second place, in answer to internal objections relating to the difficulties of belief in the doctrine, reply that of whatever nature Special Providences may be, or in whatever order of facts they may be manifested, they must exist.



§ 3. *The External Objections to the Doctrine of Special Providences.*

The most plausible of the external objections to the doctrine of Special Providences are objections which, thought to be peculiarly apposite to the doctrine itself, are in reality objections which have their root in the denial of spiritual influences of any kind whatsoever. And most of the argumentation which is advanced in proof of the falsity of the doctrine is argumentation which is conducted on lines that tacitly assume it to be false. For instance, the objection which bases itself upon the universality of the laws of Nature, and the argument which arises out of this objection, that the principle of the continuity of Nature forbids the conception of any other operations in Nature than such as are in accordance with the material order, only arrive at the explicit denial of the doctrine of Special Providences because they start with the implicit denial that there is anything spiritual in Nature at all. And we can only admit of such objections as valid arguments if we allow the fact of the spiritual kingdom, of which we have already given a substantive proof, to be called again into question.

The burden of proof whether the doctrine of Special Providences be true or false must, in view of the fact of the spiritual kingdom, be thrown upon those who declare it to be false. There is, however, a peculiar difficulty connected with the doctrine, and felt with great force by many minds, on which we may here say a few words. The difficulty, we mean, which is suggested by the inconceivableness of the mode in which Special Providences operate.

It may indeed be inconceivable to us how, through the laws of Nature, we can have an operation of God other than that which is manifested relatively to the material order of which these laws are the expression. But this does not justify us in making this inconceivability the measure of God's modes of activity. If there be a God, Who is the Disposer of all things, a Creator, on what principle can His Action be circumscribed? We must not assume our own powers to be the criterion of all

possibly existent powers ; and, though it is impossible for us to originate anything which shall do more than fulfil, except by way of accident, the immediate object we have in view, the same is not therefore impossible to greater intelligences and higher powers. The finiteness of our faculties does not permit us to measure the Power of God. And to presume to say all that God can do or not do, or to deny the Providence of God because Nature is ordered by fixed and determinate laws, is really to return in substance to the intellectual errors of antiquity and of barbarian communities. Just as men once thought that each land had its own peculiar god or gods, and conceived that the gods were moved by like passions as themselves, so now we have an inversion of the error, but still the same error in substance, in the opinion that the laws of Nature limit the possible activities of God. Anthropomorphism has merely changed its name to physiomorphism. For if it be anthropomorphism to think God to be such as we are, and to read His operation in Nature in the light of what we should do in His place, it is no less anthropomorphism to read the universe in the light of what appears to us to be its unvarying operations, and from this reading deny the possibility of any other agency of God. Man is perpetually making his own nature the measure of God's nature, and his own circumscribed sphere of activity the measure of God's activity ; and the working of a machine-like law is, to his mind, the negation of Special Providences because he conceives God to be such a one as himself. But to God there can be placed no term or limitation. And we have the witness of our spiritual being to the truth that over the unchanging laws of the universe there watches the sleepless Providence of God, whose eyes are over the righteous, and whose ears are open to their prayers.

Moreover, if it be inconceivable that spiritual influences operate through the laws of Nature, it is equally inconceivable, though somehow men persuade themselves to the contrary, that the laws of Nature are without spiritual uses. We can understand a materialist, who denies the very existence of the spiritual kingdom, insisting on the exclusively material uses of the natural laws ; but we cannot understand how

anyone who admits the existence of the spiritual, can make it conceivable to himself that the material order is to be thought of as altogether non-spiritual, or as a necessary limitation which the Almighty has imposed upon Himself. To take the material order as limiting or shutting out the action of spiritual influences, is to regard it as complete, so far as it goes, in relation to the Purpose of God. But the material order in relation to the Purpose of God is complete, not with regard to His ultimate Purpose, but with regard to the physical and protoplasmic conditions which prevail in the evolution of this Purpose. It is to matter the condition of order, and to mind the means of progress. And as such, so far from excluding the idea of a higher operation of God, it may more reasonably be taken as suggesting it. The ultimate Purpose of God is the realization of the spiritual kingdom. And though we may not be able to conceive how it is possible, it is nevertheless possible that while a single law of Nature may never be broken, suspended or contradicted, the Special Providences of God may, in the interests of this kingdom, ever be operating. Behind the unvarying laws of the universe there may watch the sleepless Providence of God; and the execution of the Purposes of this Providence may even be a higher office of the laws.

Materialism has so eaten into the tissues of men's minds that they are no longer able to appreciate the full significance of spiritual truths; and it has become a prevailing opinion that between things natural and things spiritual a great gulf is fixed. The fixity of the natural world is looked upon as opposed to the freedom attached to the concept of the spiritual; and men have come to think that Nature is not a living testimony to the God of Nature—that the lily does not manifest the munificent apparelling of a Hand Divine; that the sparrow is not fed by the bounty of its Maker; and that the hairs of our head are not numbered in the sight of God. For, forsooth, the laws of Nature work out their own ends. The lily is fair only through the operation of natural selection; the sparrow receives its provision from the lap of Nature, which is bountiful just so far as the sun's heat and the meteorological

conditions of the land and its fertility allow; and as for the numbering of our hairs, are not this and such like part of the accidental phenomena of Nature that have no manner of significance or importance? So men reason and think themselves enlightened. They believe in God, but they see not in Nature the Special Providences of God; and those who still see them and believe in them, they regard as old-fashioned and somewhat superstitious. We would, however, on this matter, if unable to form an independent judgment, rather than trust in the opinions of those who make man's mind the measure of the universe, trust in the spiritual intuitions of Him who told us to consider the lilies, to take heed to the sparrows, and to reflect that the hairs of our head are all numbered.

We can have no other idea of the Providence of God than that given to us by Jesus without yielding the doctrine altogether. Look at His words carefully, and they will be found to express the only just, accurate, and consistent outcome of the demands of the spiritual kingdom. Deny them, even in the least degree, and the flood of materialism sweeps in to destroy all that in the order of evolution is spiritual and Divine. If there be not the Providence taught by Jesus, there is no Providence at all; if God care for me, He cares for me wholly; if God be the Evolver of the universe, He is its Conservator in every part.

#### § 4. *The Internal Objections: Does God hear and answer Prayer?*

Prayer to God is the natural outcome of spiritual life under the conditions of earthly existence. It is also an element of our spiritual nature which must be taken account of in any interpretation of the universe; and its claim to immediate contact with a Person, and its assurance of being heard, cannot be explained away. Difficulties, however, have been experienced with regard to it, and though these, so far as they are of importance, are all removed by the doctrine of the Special Providences of God, there remains the difficulty which the doctrine of Special Providences itself introduces, that wherever material conditions affect the spiritual, these must in turn, so

far as they injuriously affect the spiritual, be affected by the answer to prayer.

This difficulty appears to have been deeply felt by Paley, who, in giving his views of the nature of Divine Providence, objects to the interpositions of a Providence, "always certainly distinguishable," which, in his view, "would be neither more nor less than miracles rendered frequent or common." And, though he does not deny the miraculous interferences of God, but regards the Almighty as exercising a *reserve* with regard to them, he inclines to the view of "the exercise of Providence without its being naturally perceptible to us." This leads him to admit "that although we believe ever so firmly that there is a Providence, we must prepare and provide and act as if there were none," an admission which he holds "is consistent with the most perfect assurance of the reality of a Providence." And he concludes his remarks by saying:—

"If it be still asked, of what use at all, then, is the doctrine, if it neither alter our measures nor regulate our conduct? I answer again, that it is of the greatest use, but that it is a doctrine of sentiment and piety, not (immediately at least) of action or conduct; that it applies to the consolation of men's minds, to their devotions, to the excitement of gratitude, the support of patience, the keeping alive and the strengthening of every motive for endeavouring to please our Maker; and that these are great uses."<sup>1</sup>

But, though Paley is here possibly seeking to do no more than correct the gross self-deception—we had almost said impiety—of those who are for ever tracing in their own lives, and in the lives of others, evidences of God's favour or displeasure, his words carefully weighed show that he misapprehends the true significance of Special Providences. We must not assume that their exhibition means "neither more nor less than miracles rendered frequent or common," though this view of them is undoubtedly entertained by those religious people who are always expecting miracles to happen. Nor can we say that, in answer to prayer, they are in general exhibited in easily discernible objective effects; yet neither, on the other

<sup>1</sup> *Natural Theology* (Le Gros Clarke's edition), pp. 535-6.



hand, are we to conclude that they are manifested in such a way as not to be “naturally perceptible to us.” It is difficult to distinguish Special Providences, and we certainly err when we look for them, as a rule, in the miraculous; but, nevertheless, our recognition of them is the most blessed and the most awe-inspiring—and, let us add, the least talked of—of our spiritual experiences.

Further, when Paley tells us that “we must prepare and provide and act” as if there were no Providence, he is altogether blind to those spiritual matters in which man, without Divine aid, is a very babe for helplessness; and applies to spiritual life in general a rule of conduct which is valid only as a safeguard against the temerity which would tempt God. We may not tempt God by indolently relying on His Care, or by recklessly placing ourselves in circumstances from which a Special Providence alone can free us; but it is a different matter altogether when, at the call of faith, or duty, or love, or when in adversity such as that of the patriarch Job, we yield ourselves to God in absolute reliance on His Protection.

Our belief in the Providence of God does alter our measures, and does regulate our conduct in spiritual things. Else why do we pray? Prayer asserts itself as an immediate asking of God, and only on the supposition that we use words which do not truthfully express our relations to spiritual things can we regard it as addressed to One who leaves us to act as if we could obtain for ourselves that which we ask of him. Prayer to such a one should be prayer that addresses a principle, and not a person. And Paley’s views, pushed to their extreme, are tantamount to maintaining that the nature of Providence is such that the function of prayer is relative only to the individual who prays; that our prayers are thrown out from us, and return again laden only with the fruit of blessings of which our own emotions have sown the seed; and that they are merely a self-purification of the agent whereby, through the expression of dependence upon an unknown principle, the spiritual is renewed and strengthened. We know, indeed, that without the humble spirit of the learner there is no growth in clearness of knowledge, no open eye to see the beauty and

glory of Nature, no free vision to behold moral truths and discern moral ideals, no receptive heart to receive and treasure the things of God. But it is not because it infuses into us the spirit of humility that prayer is a condition of spiritual life. The function of prayer conceived to be relative only to the person who prays is not the function as exercised by a spiritual being, but a lifeless simulation of it that robs the spirit of its dearest treasure, the living, sympathetic contact with God.

Again, Francis Galton, in his *Inquiry into Human Faculty*, gravely discusses the objective efficacy of prayer. He finds that from "the 'eloquence of the silence' of medical men" recovery from sickness is not influenced by prayers for recovery; that from statistics, prayers for longevity have no appreciable effect; that the distribution of still-births is not affected by piety; that the prayers in the Liturgy for the nobility, and for the enterprises of pious people, do not appear to secure the wisdom and piety of the one, or the prosperity and success of the other; that insurance offices, so wakeful to sanitary influences, habitually ignore the habit of prayer as one of them. Hence, he concludes that all belief in the objective efficacy of prayer must be yielded as many superstitious customs and beliefs have been yielded, or, at least, that the *onus probandi* with regard to it lies henceforth on the other side.

But in seeking to determine the objective efficacy of prayer, by statistical and comparative methods applied in this manner, Mr. Galton commits himself to a prejudgment of the question. "The 'eloquence of the silence' of medical men" in cases of prayer for recovery from sickness proves nothing, unless such cases require that a miracle be wrought; but God does not usually answer prayer by a miracle. That prayer does not remove the pious from the common lot of humanity, or make their affairs more openly prosperous, only indicates that the spiritual kingdom is not of this world, an inference the spirit has already made for itself. And that the nobility are not free from insanity, and the lord chancellors not pious, proves nothing to the point, for the prayers of the Church may be answered by the preservation of all that is desired in the natural order of things.

The only satisfactory way of applying statistics to test the objective efficacy of prayer appears to be that all men should cease, say for a single day, from prayer to God, and that statistics of the state and condition of things which supervene thereon should be carefully compared with statistics previously taken. For the pious contend that God, at the prayer of His saints, sustains and preserves the existing order of the world, that the prayers of a spiritual person are not selfish, and that the answer to the prayers of the godly is extended over the ungodly. Further, the point to look at in determining the efficacy of prayer is not the efficacy of prayer in overturning material dispositions, but the general fact whether or not the spiritual good sought for is secured. It is an unwarrantable assumption that material blessings are prayed for *per se*, and not as attendant upon or ministering to spiritual needs. In every true prayer the suppliant asks not for his will to be done, but God's, and the true test of the efficacy of prayer is the preservation and increase of spiritual life. If by the objective efficacy of prayer we are in every case to understand the overturning of material conditions, the prayer of Jesus in the garden of Gethsemane may be considered to have been unanswered; and yet Jesus came forth from the garden fortified to bear with calmness the shame and suffering of the scourging and the cross.

In some respects, however, our prayers lend colour to the view for which Mr. Galton contends. The prayers in our liturgies frequently make use of expressions appropriate to more primitive modes of thought than now prevail, and if the effects of our prayers are to be measured by their correspondence to our petitions, there can be little doubt but that no answer is frequently given. Also, in addition to praying in archaic terms, we are all too apt in our prayers, whether common or private, not only to pray, but also to dictate to the Almighty the mode in which our prayers are to be answered. In our acts of humility we manifest the pride of ignorance, and do not reflect that God answers prayer in His way, not ours; that not in the exact fulfilment of the letter of our petitions, but in accordance with the real need which finds expression

through them does He vouchsafe to reply. The prayers for recovery from sickness, for instance, have as a rule their answer not in miraculous cures, but in the extension of the knowledge of diseases, and the discovery of remedies; and the prayers for rain, not necessarily in abundant showers, but in the extended knowledge of meteorological conditions, in the greater perfection of the arts and appliances of husbandry, and in the freedom from distress secured by the importation of the harvests of other parts of the earth.

We pray to be delivered from temporal afflictions, or preserved in states of material peace and well-being, only so far as these are hindrances or aids to our spiritual life and communion with God. Our being is bound to an order of spiritual relations; and prayer is a means whereby increase of spiritual relations is attained. Prayer is the lifting up of pure hands to God for spiritual blessings. It is not a means of gratifying spiritual pride by an answering exhibition of portents, and to expect a miracle to be wrought whenever we pray is to deny that God is present in His universe, and to arraign His providential arrangements.

The interests of the spiritual kingdom of God must indeed, if they are threatened by anything in the physical order, draw to their support every power of God. The miracle is not impossible, but to manifest Himself by miracle is the exception in God's dealings with men, and not the rule. The recorded miracles, which are generally believed in by Christians, are all connected with times of supreme spiritual moment, and gather round a few important epochs of history; and God's answer by miracle is in general not the answer to a living and robust faith, but to a dying and weak one. It is usually not the crown of His condescension to His servants, but, properly understood, the rebuke of their want of faith.<sup>1</sup>

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<sup>1</sup> That the miracle is as we have stated, and essentially distinct from the providential arrangements of God, may be inferred from the fact that Jesus, the great Exponent of the spiritual laws of man's being, rebuked His disciples for want of faith, when in imminent peril of the waters they awoke Him with the cry, "Master, carest Thou not that we perish?"

## CHAPTER XI.

### THE MERCIFULNESS OF GOD

#### § 1. *The Spiritual Condition of Man.*

TO treat of the mercifulness of God is a new departure in natural theology. And, familiar as we are with the mercy of God as set forth in His Revealed Word, we have not hitherto discerned that it is intrinsically included in the witness which Nature, as including man, bears to God. But the Mercifulness of God is the radiance of His Love refracted through the dewdrops of His Providence. And unless we behold His Mercifulness we shall be in danger of misunderstanding the Providence of God. For there are dark problems connected with our spiritual being; and it is hard to realize that the very hairs of our head are numbered in the sight of God.

We live in a spiritual kingdom under the providential care of God. But how can we reconcile this with the atrocities men have perpetrated, and still perpetrate in a great measure, without the realization of their enormity? The kidnapping and butchery that prevail in the dark places of the earth; the terrible experiences of Stanley on the Congo, when with his followers he could not obtain food, because their own flesh was sought for as food; the violence and lawlessness of barbarian communities; the wars men glory in; the many evils they allow from want of thought to fester in their midst until the Howards, the Wilberforces, and the Plimsolls awake their consciences; the cruelties they have perpetrated in the name of religion, the confiscations, the expatriations, the tortures of the rack, and the horrors of the stake; how can



these things be compatible with the fact of a spiritual kingdom?

And when we take a comprehensive view of the spiritual condition of man, both past and present, do we not find that these enormities are only one phase, though perhaps the darkest, of what has prevailed and still prevails universally? In olden times, infanticide, suicide, and slavery were not accounted crimes; and unchastity and indecency provoked no shame. Men were violent and lawless; and beyond the narrow circle of their own tribe habitually disregarded the claims of humanity. And even in our own day, men in advanced communities are still very far from obeying, in response to the call of true humanity, the spiritual law of their being. Poverty is looked upon as a degradation; and the unfortunate are persecuted as guilty of fault. And even when men claim to be humane, their humanity is often nothing more than the cloak of prejudice. Not many years ago, we raised in this land a cry against cruelty, which had no existence except in our own diseased imaginations, and we used our political influence to secure the enactment of a law which, however we might seek to justify it on the plea that the advancement of knowledge is not sufficient to excuse experiments on living animals, is yet a disgrace to our Statute Book in that it hampers and makes well-nigh impossible, in this home of liberty, investigations necessary to discover the causes of disease and remove from humanity its direst plagues. And yet, very cowards and hypocrites that we are, straining at a gnat and swallowing a camel, we allow our indignation to evaporate in sighs at the real tortures inflicted everywhere on the lower creation in the noble name of "sport," and never for one moment do we think it our duty to compel the devotees of mammon to incur the extra expense of placing their telegraph wires where they shall cease to endanger the lives of birds. We may not for the advancement of knowledge and the good of mankind conduct, except under restrictions which limit their scope and go far to destroy their value, experiments in which every care is taken to avoid the infliction of pain; but "sport" may condone all kinds of

brutality, and our material interests justify the utmost callousness to the sufferings of animal life. If our boasted humanity were what we pharisaically declare it to be, should we ever mistake the cry of prejudice, and the whine of a sickly sentimentality, for the deep strong voice of outraged feeling?

Professing to be members of a spiritual kingdom under the law of sympathetic relationship, men, to say the least of it, very imperfectly obey the law. And though this is not in itself sufficient, in view of the clear teaching of the order of evolution, to disprove the fact of the spiritual kingdom, it is sufficient to lead us to seriously question the care of our Creator. It brings us face to face with the great mystery of spiritual being, before which faith in the Providence of God staggers, and the light of His Presence grows dim in the soul. The materialist might prate for ever of force, and never win a single convert to his views, but for what appear to be the inexorable strength of material conditions and the utter weakness of spiritual aspirations. And the subtle reasoning of the agnostic would carry with it no conviction—no, not even to his own mind—were it not for the enigma of evil.

### § 2. *The Position of the Agnostic.*

Yet, however much we may be perplexed by the existence of evil we must, from the evidence of the order of evolution, set aside as indisputably false all materialistic interpretations of the universe. And of other antitheistic positions the only one which here calls for serious consideration is that of the agnostic. But not even in view of the existence of evil, can agnosticism cast its chill over the sympathetic motions that reach upward unto God.

The agnostic is sometimes moved from the state of "colourless emotion," in which he professes to regard the universe, to inform us of the problems he requires to have solved. "The great fact which puzzles the mind"—we are told by one of them at such a moment—"is the vast amount of evil. It may be answered that evil is an illusion, because God is benevolent; or it may be answered that evil is deserved because God is just. In the one case the doubt is removed by denying the existence

of the difficulty: in the other it is made tolerable by satisfying our consciences."

And how shall we escape from the dilemma here placed before us? For neither answer our spiritual intuitions teach us can be accepted as complete. Either from the Benevolence of God we infer that evil is an illusion, or from His Justice that it is deserved. In the one case, we rely on the Benevolence of God and tacitly deny that He gives enlightenment; in the other, we uphold His Justice, but arraign His Love.

We notice, however, that evil is here viewed by the agnostic in direct relation to the Attributes of God. And we may well question the line of reasoning which leads him to pass from abstract conceptions of benevolence or justice to the condonation or condemnation of concrete facts. That we habitually do so does not justify the procedure. We may possibly ascend from the facts to the abstraction; but it would require a range of intellect equal to that of omniscience itself to descend from the abstraction to the facts.

Moreover, in so reasoning, are we not assuming a direct relation to exist, where the relation may be only indirect? Are we not reasoning in much the same manner as if we were to speculate how a blacksmith could beat and shape into shoes for horses a glowing ball of iron fresh from a puddling furnace? If the glowing ball can be so beaten and shaped, then, either we are under an illusion that the iron is fiery-hot because the blacksmith deals with it without suffering from its heat or its sparks, or we infer that as the iron is unbearably hot the blacksmith manipulates it because, unlike other men, he is insensible to the pain of heat. In the one case, our minds are set at rest by denying the evidence of our senses, and in the other we satisfy ourselves by the thought that the blacksmith is somewhat salamandrine. In neither case, of course, are we really satisfied. Shall we, then, deny that the iron can be so beaten and shaped? Is it not possible that we have set out from a radically false view of the facts of the case, and forgotten that there are such things as Nasmyth hammers and rolling-mills under which the iron passes between

the state in which it leaves the furnace and that in which it comes to the blacksmith? So in the case of evil, may it not be that in viewing it in direct relation to the Attributes of God we bewilder ourselves with needless questions, and wander away from rather than approach the truth?

From the clear testimony of the order of evolution, we arrive at the law of sympathetic relationship under which is evolved all that is spiritual in man. Manifestly, therefore, in all that concerns the relation of spiritual beings to spiritual things, account must be taken of this law. And with the permission of the agnostic we will state the answers he proposes to his puzzle in another form. Either evil is an illusion because the law of sympathetic relationship which declares it to be evil does not obtain, or evil exists because it is an infringement of the law of sympathy. In the one case the doubt is removed, and we become materialists if we can; in the other case it is destroyed by the resistless force of the fact of the spiritual kingdom.

The sympathetic law in the human soul declares that to be evil which is antagonistic to the permanency and universality of the relations which it establishes in the sphere of moral relations. Evil, in fact, can only be termed evil relatively to this law. If therefore the law does not exist, evil is an illusion; but the law does exist; therefore evil exists.

It may be said, however, that we here, by the expedient of inverting the problem to be solved, beg the question at issue. The law of sympathetic relationship is an induction from facts; and the law must be viewed in the light of the facts, not the facts in the light of the law. The facts are that the law of sympathy is not obeyed by every moral agent; and so it may be said that the view of the state of morality ought to determine the view of the law, and that the proper conclusion is that as the law is not obeyed it does not exist. We grant that the law must be viewed in the light of the facts; but this does not permit our view of the state of morality to determine our view respecting the law, for the simple reason that the law of sympathetic relationship prevails not only in the moral relations but in every other

body of relations that belong to spiritual being. As well might we say that the phenomena of the diffusion of gases set aside the law of gravitation, because carbonic acid, though heavier than the other constituents of the atmosphere, is diffused throughout them, as say that the state of morality disproves the sympathetic law. And just as we give an explanation of the phenomena of the diffusion of gases which does not contradict the law of gravitation, so must we give an explanation of the state of morality which shall not contradict the sympathetic law.

### § 3. *The Problem of Physical Evil.*

We must give a reason for the existence of evil which shall be in accordance with the law of sympathetic relationship, and consonant with the fact of the spiritual kingdom.

But are there not physical evils as well as moral? And if we are to take such a view of moral evil as shall satisfy the demands of the spiritual kingdom and the spiritual law, what are we to do, it may be asked, with regard to the physical evil which entailed suffering and death on all sentient life, ages before man appeared upon the earth?

We answer, in the first place, that to put physical evil in the same category with moral evil is to create a confusion between two meanings of the word evil. By physical evil we evidently mean the evil which arises from those dispositions of the universe which are the cause of pain and suffering, and loss and death, to the sentient beings in the universe. The term evil, therefore, as applied to physical evil, is used relatively to the effects of these dispositions, and can mean nothing more than that in the sum of relations which affect sentient beings, there are certain relations which affect them injuriously. But by moral evil we mean not the injurious effects of certain dispositions of things, but a personal disregard of law. And this is a meaning of the word totally distinct from the former. Moral evil is a contravention of the law of spiritual being; physical evil contravenes no law. Moral evil is caused by the non-observance on the part of spiritual beings of the sympathetic law of their being



physical evil is, so far as it can be asserted to prevail, inseparably attached to the existence of animal life in the present condition of things. Moral evil is due to personal defect; physical evil is due to imperfection of condition.

And in the second place we answer that it is very questionable if there be any such thing as physical evil. Physical and mental pains are not in themselves evils. If they be so, then mind itself is an evil. Where compensations accompany pains we cannot term them physical evils; and in animal life there are few pains without compensatory or related pleasures to qualify them. In the lower animals, in whom pain and suffering undoubtedly exist, the action of pain in general tends to the conservation of the individual, and the degree to which it is felt is proportional to the degree of mind that is manifested. Also in the struggle for existence the fear in animals of their natural enemies is correlated to instincts of preservation, the exercise of which is known to be a source of pleasurable emotion; and the lives of all animals, except in so far as they are affected directly or indirectly by man, are probably very equable in their tenor in consequence of the general uniformity of Nature and the slowness of natural changes; and an equable tenor of life, as is well known, deadens the sensibility to pain. Take away, then, from the lower animals the uncertain element which man introduces into their conditions by causing sudden and rapid changes in their environment, and the accidents which occur when he attacks them with weapons which maim and do not kill, and who can call their condition, when we see them evidently enjoying it, anything but enjoyable? The pains of parturition in many mammals are, indeed, known to be severe; but this is universally recognised not to be without a full compensation. Animal life is also known to be the prey of parasites, no less than man; but this is part of the general phenomena of disease, the peculiar consciousness of which we can scarcely think them to possess. They are overtaken at times by famines, floods, and storms, and we see in them a manifest dread of lightning; but death in general comes upon them without anticipation of it, and is probably attended by circumstances which rob it of its

pains. Moreover, we must not morbidly assume that animal emotions are as keenly edged as our own emotions; and if there be a few circumstances connected with their lives which appear to be evils, we may well set over against these our inability to place ourselves exactly in line with the range of their emotions.

➤ Only in man, and as associated with man, in whom moral evil indisputably dwells, can we recognize anything that is worthy of the name of physical evil; and physical evil, as man experiences it, or causes it to others, is so much mixed up with moral evil that it is quite conceivable that, if moral evil had not existed, physical evil would not have been experienced. It is true, indeed, that man is exposed to the same conditions of life as the lower animals; and that disease and death have, from the higher consciousness which obtains in man, elements of suffering added to them, which in other animals are unknown; but if we exclude from the domain of physical evil the evils which spring from moral evil (such as the miseries of war, cruelty and oppression, injustice and strife, and such as the evils which the individual brings upon himself by careless living, gluttony, drunkenness, and debauchery), the residuum that remains under the forms of disease and death might possibly be found to be of a very mild and bearable kind. Indeed, conditions, as we find them, are so greatly overgrown with moral evils and their consequences, that it is impossible to fix a degree to the blessedness of the state which might have prevailed if moral evil had not existed.

We may even carry the argument a step further, and show that the very conception of physical evil, as applying to man independently of moral evil, entails a view of certain moral evils which is intolerable to the spiritual law.

➤ Let us suppose that when we have eliminated the effects of moral evil, there remains in the case of man a residuum of physical evil. It may then be said that in relation to man, physical evil possibly admits of explanation as an admonition to the soul that the true sphere of spiritual life is not here, but elsewhere. We have ourselves, before we came into view of moral evil, suggested this explanation as possible; and under

the condition of moral evil it is the only explanation that can be received. But we are reasoning on the supposition that the condition of moral evil does not prevail. And though much of what we call physical evil manifestly tends to the evolution of spiritual life, and though pain and suffering may possibly be regarded as a teaching of the soul that through tribulation we attain to glory, there must be set against this view of physical evil the objection that we could not refuse to apply the same explanation to the very large class of moral evils which apparently arise out of the conditions of life. For these moral evils an adequate explanation must be found. And instead of extending the explanation of the physical evils over these moral evils we may with more reason extend the explanation which satisfactorily accounts for the moral evils over the physical. Wherever the true home of spiritual life may be, its rise in the material order brought with it the demand that its outward and inward conditions should be harmonious, that outwardly material conditions should be in harmony with the fact of the spiritual kingdom, and that inwardly moral conditions arising out of the conditions of life should be such that the spiritual law could be fully obeyed. Yet much of moral evil is evidently due to sins of ignorance, and not a little may plausibly be ascribed to the selfish principle inherent in the necessity of the struggle for existence. And, though the immediate progenitors of man must have, to a great extent, cleared their environment of external enemies, so that the adult energies of life could be devoted to the care of the young during their prolonged period of infancy, history not only teaches us that man has not been altogether freed from the struggle to exist, but also proves to us that, under the struggle for existence, the greatest enemy of mankind has been man himself, driven to the sword by interests which conflicted with those of his fellows. And if we are to admit the fact of physical evil, and explain it, as has been suggested, it would be difficult to show why the same explanation does not apply to moral evils such as these, which apparently arise from the same conditions of life as the presumed physical evils.

From the Providence of God we should naturally conclude that when spiritual being was realized in the universe, the conditions were such that the law of sympathy could be fully obeyed; that it was possible for man's spiritual being to have been harmoniously developed, and his sphere of moral relations gradually enlarged in such a manner that, as he grew in spiritual vision, he might have been free from sins of ignorance; and that it was also possible for such a state of communion to be established and continued between the spirit of man and the Father of spirits, that man might have been preserved from disobedience in any form to the spiritual law, and from contamination by violence, depravity, or barbarity. These requirements are the natural demands of the spiritual order; and they are, moreover, in exact accordance with the position we have assumed with regard to the spiritual in man and the Providence of God. Also, from the fact that religion is an integral part of our spiritual nature, claiming immediate contact and abiding communion with God in prayer, in adoration, and in love, it follows that, unless there were reasons for the contrary, this contact and communion must ever have existed between spiritual beings on the earth and their Father in the Unseen.

Has the state of things then not been so? And are all the miseries which arise from imperfect spiritual development to be classed with physical evils, as necessarily preparatory to a higher and purer sphere of spiritual life? How do we know that man was not originally in full communion with God; and providentially placed in circumstances corresponding to those described in the Hebrew story of the Garden of Eden; which communion and care he lost by disobedience to the spiritual law? If in the past the contact and communion with God was partial only and incomplete, may not the cause have been the same as that to which we now refer a similar state of things—that of sin?

To disobey the spiritual law is to become dead to it, to have eyes to see but not to see, ears to hear but not to hear, a mind to conceive but to bring forth no conception. And if we presuppose the fact that man, by disobedience, cut himself off

from sympathetic union with God, all the enigmas of evil admit of a simple and easy explanation. Fallen from God, man could only return to God through sufferings manifold, by the re-awakening of his then unguided spiritual being slumbering under the darkness of imperfect mental development, and in the vitiated atmosphere of a corrupted will. Removed from sympathetic contact with God, he could live only under the lower law of natural selection, until under the tuition of this law—for all God's laws ultimately tend to His glory—his spiritual life was restored again. As the measure of My Law in you, so is your life in Me, are the words of the High and Holy One to all His spiritual creation; and just in proportion to the degree in which fallen man could attain to a renewed recognition of the sympathetic law would he become capable of renewed communion with God.

On the view of the truth of the Fall of man, all evil, both physical and moral, may be regarded as the consequences of the fallen condition of man and the accumulated effects of man's disobedience; and may be looked upon as pertaining not to the order of evolution, but to a perversion of it, and as not existing according to the Eternal Purpose of God, but as militating against that Purpose. And it would follow from this that the consequences of moral evil strike deeper than we are now accustomed to think; and that there is more in the dogma of the theologian, that the sin of man is the cause of physical evil, than recent ages have been ready to admit.

The doctrine of the Divine Immanence implies that God is present in His material universe, no less than in His spiritual kingdom. Our spirit sees in Nature an operation of God other than that which is relative to the material order. Prayer to God for spiritual blessings is a natural outcome of spiritual life. And the laws of Nature, in fulfilling their material office, have, there is every reason to conclude, a most important mission with regard to the higher spiritual economy. The whole doctrine developed in our previous chapter, in fact, goes to prove that the material and spiritual worlds are continuously acting and re-acting on each other. And the present want of harmony between the trend of the material evolution



and the demands of the spiritual kingdom may be due to no other cause than that spiritual influences, necessary to the due development of the material world as the home of spiritual beings, were withdrawn from the earth when man became disobedient to the spiritual law.

The physical world manifests to us a progression; and so far from being indicative of future retrogression, the relations established in it are everywhere the foundation of more extended relations.<sup>1</sup> The redistribution of energy lies at the base of the chemical elements, and the chemical elements, in turn, under the same redistribution of energy, give birth to the more complex forms of matter. The activities of protoplasm enter into extended relationship with the physical order, and adaptations of life-forms become expressive of the harmonies of the universe. Mind dawns on the universe and increases in range of consciousness until the universe is realized as an object of thought. And if we assume the reversal of this progression and the future desolation of the earth, it is because mind and life depend for their manifestation on physical sources of energy, which, in accordance with the physical law of the dissipation of energy, are slowly being exhausted. But the spiritual in man to some degree, even under present conditions, rules over Nature. And it is not altogether inconceivable<sup>2</sup> that the spiritual kingdom, in full communion with its Spiritual Head, may intrinsically possess a power of control over the dissipation of energy, so that under all circumstances the physical order becomes subservient to the spiritual. And it may possibly be that had spiritual beings on the earth preserved intact their relationship with God, spiritual influences would have been operative in the material world, and would have secured not only the harmonious evolution of spiritual relations, but also the perfection of the material order itself. The mighty sun shines down upon the earth, and the tropics are the abode of malaria or wildernesses of desert sand. The crust of the earth shrinks, the cold creeps down from its poles, storms arise and hurry over land and sea, and

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<sup>1</sup> See chap. iv. § 8.

<sup>2</sup> See chap. xii. § 1, p. 304.

the garden of God is desolated. The bacilli breed and multiply, and man is smitten in his pride. The dear hearts of children forget to beat; the bright intelligence of manhood is quenched in death; and the ripe wisdom of age dies on the lips as palsied limbs totter feebly to the grave. Why? Because these things are according to an unchanging material order? Rather, let us say, because the Divine Voice ceased to be heard on earth, and the forces of Nature destined to be vivified by spiritual influences continued their course on the lower plane.

Not until the kingdom of God comes in power shall the wolf lie down with the lamb. "The earnest expectation of the creation waiteth for the revealing of the sons of God." And not without reason did the seer of old, to whom, in the affliction of his nation, was vouchsafed the vision of God, picture in the regenerated kingdom a stream flowing from under the Temple, and waxing mighty to regenerate the cheerless desolation of the deserted sea.

#### § 4. *The Fall, the only Adequate Explanation of the Spiritual Condition of Man.*

Concerning the moral state of man there are two possible views, and two only, which we can take. Either that man has fallen from an original state of purity, and is painfully groping his way back again, relying on the Mercifulness of God to help him and finally restore him; or that man has been left to himself, and has gradually attained to the knowledge and observance of the spiritual law by bitter experience of the disastrous effects of not observing it.

It might, however, be thought a possible view, that the spiritual law is realized only to the same extent that spirituality itself is realized, and that obedience to the law, so far as realized—although it may appear imperfect obedience to those of more spirituality—cannot in itself be termed evil. Is not the love of knowledge often too feeble to impel to serious study, æsthetic taste too low to rise above the sensuous, and religious faith too formless to be confessed? Why, then, should we look for morality to be higher than our other spiritual attributes? All moral evil is personally

felt in the consciences of men; morality lies in the intention of the act, not in the character of the action. And may not, then, that only be moral evil which arises when the law is known and broken in the full knowledge of it?

According to this view, evils wrought in ignorance might be said to be "simply the pressure of our own finitude," which "even the infinite love and compassion could not relieve us of . . . without accomplishing the inherently impossible, to which omnipotence itself cannot extend";<sup>1</sup> and their effects might be considered "the inevitable shadow-side of all finite reality."<sup>2</sup>

But if we take this view we necessarily ascribe much that we call evil to imperfection of being, and immediately involve ourselves in difficulties with regard to the spiritual law. Moral evil is a disregard of the sympathetic law which is binding upon all spiritual beings; and to ascribe any form of it to imperfection of being, necessarily implies that spiritual beings are bound by a law which they cannot fully obey.

Moreover, whether we realize the spiritual law or not, it exists; and disobedience to it in any particular produces the same effects on others, whether done wittingly or unwittingly. And, having regard to the spiritual kingdom at large, we fail to see in what respects this view is to be differentiated from the view that man has been left to himself. A man may keep the spiritual law, let us say, so far as he realizes it. But is he not so placed that the law has claims upon him far beyond those which he realizes? Are there not duties incumbent upon him, from his position relatively to other men and to the lower animals, of which he knows nothing, and which therefore he disregards? Observances, which he ought to comply with that his life may be innocent, and with which he does not comply simply because he cannot discern them? Actions, which he ought to avoid, but which he cannot avoid because of the strength of his impulses and the weakness of his will?

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<sup>1</sup> F. E. ABBOT, *Scientific Theism*, p. 207.

<sup>2</sup> *Ibid.*

On this view, man emerges from animal slumber to find himself in the region of the spiritual under a spiritual law. But his field of spiritual vision is circumscribed and confused, and he is continually awaking more and more to the knowledge that his deeds are not in accordance with the spiritual law. His sympathies are narrow; he butchers the men of a neighbouring tribe, until pity, perchance, is aroused by the sight of a ring of corpses which have fallen by his hand, and he learns that his actions in the past have been barbarous and cruel. His intellectual vision is not clear; he realizes but few of his moral relations to his fellow-men, and cheats and cozens them until somehow he finds out the golden rule, that he should do unto others as he would that they should do unto him. His power of self-control is weak; he lies uncovered in his drunkenness, or stands snarling in his rage, until his powers of self-command are developed to check and control his appetites and impulses. Does not all this imply that man has practically been left to himself?

But it is not true that the law is realized only to the same extent that spirituality itself is realized. The fact is, we realize the law, but spurn the obligation to obey it. Of course, we cannot give obedience to the law in a greater degree than we possess the ability to do so, but in every direction of our spiritual life, while we have the clearest intellectual recognition of our spiritual aims, we at the same time steadily pursue material ends at variance with them. We talk of the love of knowledge, but expect books to be written so that no effort of mind is required to understand them, and apply Bishop Butler's canon, "that nothing can be understood without that degree of thought which is proper to it," only to matters wherein our material interests are concerned. We count it up as a matter of pounds, shillings, and pence, that will be returned to us in the increased skill and intelligence of our workmen, and establish science-classes in every town, while we leave schools of art to languish. We permit newspapers to publish betting lists without restriction, and laud to the skies a method of conducting business which is founded on the principle that every man would, if he could, overreach his fellows; and yet

withal we are extremely touchy with regard to the condition of our public morality. We lift up hands in holy horror at the suggestion to open museums on a Sunday, but we complacently suffer the religious teaching in Board Schools to be diluted until the religious education of our children is a sham.

Moreover, applying the hypothesis, that the spiritual law is realized only to the same extent that spirituality itself is realized, to the circumstances of those whose degraded spiritual condition we really advance it to explain, we find that so far from being dead or indifferent to spiritual matters, the lower races of men are keenly alive to them, and manifest in innumerable forms of evil spiritual powers turned awry and uncontrolled by the spiritual law. The African, in pitiful delusion, butchers his hundreds that a chief may not go unaccompanied into another world. The Indian, in despite of his mystic pantheism, worships idols of wood and stone, and gives his life to the holy Ganges. The Mexican offered human blood on the altars of his sun-god. Children have passed through the fire to Moloch. Prostitution has found a home in temples. Men have gone mad with religious frenzy, and drawn after them crowds of deluded followers. Religion has been preached by the sword, dogmas enforced by persecution, and consciences coerced by torture. And if we do not accept the view of the Fall of man, what significance can these things have, but that in man there was born a thing of power that knew not how to exercise its powers aright, and that required to be taught by bitter experience how best to live?

Either man is in a fallen condition, or he has been left to himself by God. One of these views, with the full light of the evolution teaching before us, we are compelled to accept. And can we hesitate between the two?

Are we to take it that man has been left to himself? That for him the law of sympathetic relationship does not obtain, until his eyes are opened and he sees that he has broken it? That he is a being plunging through the darkness of a primæval forest, amid dim lights of reason, stumbling and falling, and learning only from his stumbles and his falls how



best to avoid the dangers of the way, until he emerges into the light of God? That his spiritual vision of God is clear only in the degree that he overcomes his habits of ignorance, and avoids yielding to the lower propensities within him? And that God only hears his cry when out of the depth of remorse he has struggled into the recognition of the Law of God?

To accept such a conclusion as this, we are forced to think of God as a cold and dignified monarch who has commanded before him a little child, but who heeds not the child until moved by pity at its screams as it slips and falls on the marble pavement that leads to his presence. And we do not clear away the difficulties which beset this view, by turning our attention to the progress and ultimate tendencies of the evolution of spiritual life. These cannot justify God in denying to spiritual beings the help, they had and have the right to expect, in order that their lives should be pure. Sin, on this view, is not sin, but imperfection; and for man to be punished by remorse and by temporal loss for breaking a law, which he only discerns after breaking it, is a judgment to move angels to rebellion. In fact, if God have so left man to himself, words fail us to express our sense of the hideousness of the system of evolution. And the deepest, truest prayer that humanity can utter is to lift up impotent hands to the great god of this material earth, and cry, "Great sun, withdraw thy streams of quickening light, so that the phantasms thou embodiest may sink again into forgetfulness!"

### § 5. *The Fall, a Reasonable Belief.*

But can we reasonably accept the view of the Fall of man?

Our position is this—That when spiritual life appeared, it demanded, and received as its birthright from the Almighty, such a measure of care and providential guidance as was fitted to secure the adequate and harmonious evolution of its spiritual relations.

This position we substantiate by adducing the fact of the spiritual kingdom.

And that men now, in the full realization of the spiritual law, nevertheless break it, we hold to be a sufficient reason for

concluding that man had power to break it while in sinless contact with God.

That man did fall is the only possible way in which we can reconcile the present condition of spiritual beings with the Providence of God. And in the severance of the union of man with God, through disobedience on the part of man, we find the only satisfactory explanation of the evil that exists on the earth.

And there is nothing in the evolution facts with regard to the descent of man to militate against the view of the Fall. That man experienced at first a full communion with God, does not demand that a miracle should have been wrought when he first appeared on the earth. All that is required is that the various races of man should be descendants of a common stock—not necessarily of a single pair—and there is every reason to conclude that the fact was so.<sup>1</sup>

There is a view, however, held by some evolutionists, and widely current among minds which have imbibed the teaching of evolution, that evil is simply the result of the brute-inheritance. And Fiske, who, both in his *Cosmic Philosophy*, and in his small book on *Man's Destiny*, clearly recognises the sympathetic law, nevertheless tells us,

“Original sin is neither more nor less than the brute-inheritance which every man carries with him, and the process of evolution is an advance towards true salvation.” (*Man's Destiny*, p. 103.)

Again, he says :—

“The manifestation of selfish and hateful feelings will be more and more sternly repressed by public opinion, and such feelings will become weakened by disuse, while the sympathetic feelings will increase in strength as the sphere of their exercise is enlarged. And thus at length we see what human progress means. It means throwing off the brute-inheritance—gradually throwing it off through ages of struggle, that are, by-and-by, to make the struggle needless.” (*Ibid.* pp. 102, 3.)

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<sup>1</sup> See DARWIN, *The Descent of Man*, chap. viii., and *The Expression of the Emotions*, pp. 361, 367.

That the spiritual partakes of an evolution goes without question; but that the evolution is one which proceeds by way of getting rid of lower propensities, which impel to wrong conduct, is a view which, to be justified, must ground itself upon clear facts of evolution. We certainly see in man barbarous and revengeful traits which would indicate that there has been gathered up in him the ferocious savagery of every animal; yet, on the other hand, there are very few, if any, of the baser passions of man which can be clearly traced to similar passions in the brute creation. Indeed, with the exception of the nervous processes which accompany the passion of rage, as seen in the expression of it by showing the canine teeth, there are very slight and uncertain indications of the inheritance from the brutes of any nervous processes which are associated with undesirable emotions. And that we have inherited many such is extremely improbable, by reason of the disturbance of the nervous system that must have occurred when the immediate progenitors of man assumed the upright position of the body, and the prolonged stage of infancy began. As the change from going on all-fours to walking on two legs gradually took place, there must have been both a breaking down of previous nervous adjustments, and an acquisition of new ones; and a double change must have taken place in the relations of the nervous system to the muscular activities on the one side, and in the relations of external stimuli to the organism on the other, so that practically a divorce ensued between the union of nervous reactions and mental emotions. Indeed, the prolonged stage of infancy is itself evidence of the revolutionary character of the changes that must then have occurred in nervous adjustments. As the upright position was being assumed, the nervous organization was called upon to disintegrate its old adjustments, and to respond to new needs to which it had not been ancestrally adapted; and this call was responded to by throwing upon the period of infancy and the mental life of the child, the task of co-ordinating anew the nervous system to the body. Infancy was prolonged until the infant forgot to grasp with hands and feet, and learned to support the body in an upright

position, and to use its hands as adjuncts to its head. The prolonged stage of infancy is, in fact, a direct resultant of the change from the prone to the upright position. And with its occurrence the bestial survivals must have been effectually broken. The view that we should let the ape and tiger die is the teaching of poetry, not of science. And it is noteworthy, in view of the fact that our emotions are influenced by outgoing nervous currents, that the expressions of many of our emotions, such as that of frowning in anger, have been acquired since the upright position was assumed. Moreover, Fiske has himself drawn attention to the significance of babyhood, and the evolution of the family bond as markedly differentiating man from the lower animals.<sup>1</sup> And we may add that, with regard to one very great branch of moral evil, the testimony of Darwin is explicit. He says:

“Our early semi-human progenitors would not have practised infanticide and polyandry; for the instincts of the lower animals are never so perverted as to lead them regularly to destroy their own offspring, or to be quite devoid of jealousy.” (*Descent of Man*, pp. 46, 47.)

By the term brute-inheritance, however, Fiske probably means us to understand, not the bestial survivals, but the low degree of mental life of which man was capable through the character of his inherited nervous organization; which organization, the plasticity he has acquired in babyhood gives him the condition of modifying by training, “so that progress may go on with ever-increasing sureness and rapidity.” He tells us:

“The whole history of civilization is largely the history of man’s awkward and stumbling efforts to avail himself of this flexibility of mental constitution, with which God has endowed him. For many a weary age the progress man achieved was feeble and halting.” (*Excursions of an Evolutionist*, p. 317.)

And again he tells us:—

“Half the cruelty in the world is the direct result of stupid incapacity to put one’s self in the other man’s place.” (*Destiny of Man*, p. 99.)

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<sup>1</sup> *Excursions of an Evolutionist*, xii. pp. 306-9.

In other words, he probably means by the brute-inheritance the very order of facts which we have called in the hypothesis of the Fall to explain. And we can only give assent to his views by yielding altogether the doctrine of the Providence of God, and doing violence to the fact of the spiritual kingdom.

A careful examination, however, of the moral condition of man shows that the evil which he does owes its origin rather to a perversion of mental endowments than to a low degree of mental life. His debased personal morality is probably due, not to a following of lower instincts and an imperfect mental development, but to a misuse of instinct and the misapplication of mental endowments. "The origin of moral evil was the conscious abuse of means, instead of using them solely for the ends for which they were designed," says the Rev. G. Henslow.<sup>1</sup> And, though we may not regard the means as designed for the end otherwise than by natural selection, there is a great deal of truth in this view when applied to the personal moral defects of man. Agreeable feelings go along with the instincts and appetencies of animal life; and most, if not all, of man's gross animalistic defects of character are due to the perversion of these instincts and appetencies from their natural uses, so that they become ends in themselves because of the pleasure derived from their indulgence. As examples, we have the passion of lust, the weakening of marital love, the appetite for intoxicating drink, and the greed of gluttony.

In these defects the desire to gratify the instinct or appetency has become detached from its proper object and attached to the accompanying circumstances. A disturbance therefore must have occurred, so that the conditions, which would otherwise have constrained the instinct or appetency to act only under the spur of the natural use, became displaced by a propensity to gratify it apart from the natural use. And the main question with which we have here to deal is, did this disturbance result from an act of conscious volition on the part of man, or from the nature of the circumstances in which man was placed?

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<sup>1</sup> *Evolution and Religion*, p. 144.



If it resulted from an act of conscious volition, there can be no question but that man must be held guilty of perpetrating and perpetuating the abuse.

The alternative view, however, that it arose from the circumstances in which man was placed, appears to have been overlooked by Professor Henslow; for on this view it is clear that the pleasure would become the immediate end without the conscious realization of the abuse. But it is also clear that, even on this view, there still remains the fact that the agent by seeking his own gratification set aside all other law but that of his own will; and not unless he was still on the plane of the brute creation, and without the guidance of the spiritual law, could he plead in justification his ignorance of the abuse.

We infer, then, with regard to animalistic defects of character, either that man is responsible for the abuse of means whether he was conscious of the abuse or not, or that he was under no law. The one inference is that of the Fall. And the alternative inference it is impossible to entertain in face of the law of sympathetic relationship and the fact of the spiritual kingdom. We are therefore bound to conclude that in all cases of moral evil which have arisen from the abuse of means, man has been personally responsible for the abuse. And this applies not only to the animalistic defects of character, but also to the less gross personal defects manifested in such abuses of means as the habit of indolence and the love of money.

Also with regard to all other forms of evil, as the violence and lawlessness which characterised the earliest known state of society, the delight in slaughter, the joy in cruelty, the lusts of power and ambition, the telling of lies, and whatever else sets aside the sympathetic law, we must similarly conclude that these are due not to the force of circumstances, nor to imperfect mental development, but to the declension of man from the spiritual law of his being. For if they are to be ascribed not to a state of moral degradation which brought with it spiritual death and physical evil, but directly or indirectly to such causes as the fierceness of the struggle for existence that began when the human race increased in numbers, and conflicting interests arose between communities, we at once not

only deny the doctrine of the Providence of God, but also call into question the very existence of the spiritual kingdom and of Purpose in evolution.

Hence, if man has been left, as the course of human history proves he has, to the rough mercies of a struggle for existence that gave advantage to the powerful and violent members of a tribe, and that has more than once delivered civilised cities into the hands of barbarian hordes, this can only have been, in view of the spiritual law and the fact of the spiritual kingdom, in consequence of his own action in separating himself from God.

And accepting the view of the Fall of man, we must enter a caution against attempts to minimise it or explain it away. Canon Curteis, in his Boyle Lectures,<sup>1</sup> tells us that at the "critical turning-point of all the world's history," when spiritual life began, for one brief moment "emerging from the animal world of absolute and sinless unconsciousness, primæval man stood there innocent, however capable now of falling." Poised then "as it were on a razor's edge," he says, "too surely a fall would come." And he afterwards adds that there is no contradiction whatever, but complete harmony, between the Christian view of the Fall and the view that the "scientific account of the universal moral failure we see around us is to be found in the doctrine of unbroken 'bestial survivals' within us." But however possible it may be from the Christian point of view thus to reconcile the Fall with the so-called scientific doctrine of "unbroken 'bestial survivals,'" we find it utterly impossible to do so from the point of view of our natural theology. We cannot accept the view that man was poised, as it were, "on a razor's edge." This is too fine and thin to be differentiated from the view that man was left to himself by God. Neither can we hold the view that the Fall was inevitable. If the Fall were inevitable, then God's law of the spirit is subservient to His law of matter, and evolution has resulted in the blundering creation of a Frankenstein. Nor can we assent to the view that the Fall arose from "some

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<sup>1</sup> *The Scientific Obstacles to Christian Belief*, pp. 103-105.

lower instinct obeyed, some bestial memory indulged, some carnal impulse gratified,"<sup>1</sup> which brings with it, "on reflection, shame and self-reproach," for if this were so, we should have to deny the Providence of God, and conclude man's crime to have been his misfortune and not his fault. Man can only have erred from the free motion of his own spiritual being.<sup>2</sup>

### § 6. *Evil in Relation to the Spiritual Kingdom.*

But it might be objected if evil be disobedience to law, and punishment followed the first sin, why do evil men now go practically unpunished? There is no disobedience which goes unpunished to God's physical law; if a man disobeys that law, he suffers, and often suffers cruelly. But in the industrial, political, social, and religious worlds there are men—it is immaterial to the argument whether they be many or few—spiritual parasites, traders on the spiritual life-blood of humanity, disregarding of the sympathetic law of their being, who now, as in the days of the Psalmist, come into no trouble like other folk, who wear pride as a chain about their necks, whose eyes swell out with fatness, and who have more than heart could wish. And yet God suffers them. The bounties of His harvests are poured out into the lap of the worthy and the unworthy. His sun shines on the just and the unjust. His rains fall for the thankful and the unthankful. And how can we understand this state of things if the law of sympathetic relationship be a law of God?

How but by realizing that while God subjects man to His general decrees, He is yet a God of Mercy?

Let us suppose that the citizens of some great city, happily blessed by copious springs in their immediate vicinity, have

<sup>1</sup> CURTEIS: *The Scientific Obstacles, etc.* p. 113.

<sup>2</sup> We may here remark that the Biblical account of the first man does not support the inferences drawn by theologians in every age, that man was originally a perfectly civilised and highly cultured being. On the contrary, from the very simplicity of the command laid upon him and the clearness with which the punishment of disobedience was stated, we may more reasonably conclude that his condition was very primitive indeed. "But of the Tree of the knowledge of good and evil, thou shalt not eat of it; for in the day that thou eatest thereof thou shalt surely die," is a command in its simplicity fitted for a child.

never troubled themselves to draw a constant and inexhaustible supply of water from the natural reservoirs in the distant hills; and that therefore, in some particular year when the rainfall has been much below the average, they suffer greatly from the drought, and petition God for rain. Will God hear them? If they had known of the usual working of God's Providence, and the natural laws through which He operates in sending His blessing of rain upon the earth, and yet through culpable want of thought had neglected to bestir themselves so that from the lakes that lie in the hills water from times of plenty might be at hand to serve in times of famine, did they not deserve to suffer? God had in His Providence taught them His order of Nature; and do not the words apply to them, "He that will not work, neither let him eat"? Has not God appointed laws for man to obey, and if man obey them not, will he not certainly be punished? Yes truly, if God were not a God of Mercy. And therefore we say that, for the sake of ten righteous persons in the city, God would hear their prayer and in some way relieve their distress; even if upon waters less innocent than those so scarce, there had been spent in that city in a single year more than would have built abundance of reservoirs.

The Mercifulness of God is really a corollary from the sympathetic law of the spiritual order. Man may break the sympathetic law, but God never can. In this law, God has bound man to Himself by chains of love; and if man himself loves not, God in His Mercy, on His part, still continues His Love. Let us put the case of one who has not lived up to the sympathetic law of his being. And who has? We have broken that law, and disregarded the obligations it imposes upon us. We have cut ourselves off from living communion with God; and henceforth our way is that which leads from Jerusalem, the city of peace, to Jericho, the city accursed of God. We use our spiritual endowments to pander unto self; and thereupon arise murders, uncleanness, thefts, and all the long train of moral evils. And, if perchance left half-dead in our misery of sin, and sin's heavy legacy of sorrow, we look for succour to the passers-by, who can help us? Is the

law of the spiritual kingdom less inelastic than the law of the physical world? And who can rid us from the defilements of the soul? One sin has brought another in its train until, having harboured vice, we have become vile. Yet we long to be healed. But where is there wine and oil for our bruises, except in the Mercifulness of God? Out of our desolation therefore we cry unto Him. This cry is a renewal of the soul, a motion of the spiritual reviving within us; and to no motion of the spirit is the Father of spirits unheedful.

God's Mercy is over all His works; and though evil seeks to mar His Purpose, His Purpose still fulfils itself. Through trials and purifyings He leads man back to Himself. And even the African who knows not the sympathetic law, but on the banks of the Congo has been seen to trade his slaves as food as we trade cattle, even he is not deserted by God. Fit only to be a slave, and sold into slavery, his conditions of life are nevertheless ameliorated. And God in His Providence, while He permits him to be removed from the scene of his orgies, yet gives him golden chains to wear, that worn with patience will bring him to the recognition of himself as a sympathetic being.

### § 7. *The Permission of Evil.*

We do not mean, in the example of the Providence of God just given, to imply that the institution of slavery is of Divine appointment. Nothing evil can be. We merely illustrate how God overrules evil for good. And this introduces us to another problem connected with the permission of evil.

Reasoning from the fact of evil, and not perceiving that evil is something contrary to the Purpose of God, many have thought it sufficient to say, in explanation of its existence, that it must in some way contribute to good, or it would not be. God, who foreknew that the angels would fall, did not deprive them of their freedom of will; *potentius et melius esse judicans etiam de malis benefacere quam mala esse non sinere*, says S. Augustine.<sup>1</sup> But though we may not deny that God

<sup>1</sup> *De Civitate Dei*, book xxii. chap. i.



does bring good out of evil, we must carefully distinguish the Eternal Purpose of God from the Foreknowledge and Will of God. Evil of itself cannot contribute unto good: for this would be to make it part of God's Eternal Purpose. It cannot be part of His Plan. It cannot directly contribute to His Glory. It arises only because spiritual beings, by disobeying the spiritual law of their being, mar the Purpose of God; and however much it may be permitted and overruled for good, we can see no other reason for its continued existence than that God wills it so because He is Merciful.

But how can we justify the Mercifulness of God in permitting evil to exist? He is doubtlessly merciful towards the wrongdoer, insomuch that He does not withdraw from him the material comforts and blessings of life; except, of course, so far as that in the natural order of things barbarous communities and vicious lives contain within themselves the seed of decay and death. But, is mercifulness towards the wrong-doer, justice to those who endure the wrong? But who can claim justice? Who shall assert himself to be meritorious before God?

It may, however, be contended that God is merciful towards the one but not towards the other. That He is not merciful to those who in a measure keep the sympathetic law, and in so doing suffer at the hands of those who keep it not at all. It is the very irony of mercifulness that the industrious should share the fruit of their labour with the parasites of the social hive; that the peaceful should by their very desire for peace provoke the assaults of the turbulent; that the generous should be imposed upon, the just deceived by the unjust, and the innocent shamed by the shameless. But to insist upon these and such-like is to forget that where evil is permitted evils must be expected to abound; and that mercifulness towards evil includes the endurance of it. The saint endures the sinner, but the sinner endures neither a sinner nor a saint.

God's mercifulness towards evil calls for a corresponding mercifulness on the part of all who are peacemakers and workers together with Him. The longsuffering He Himself

shows He asks for from His saints. And it is God's Will that the evil on the earth shall be endured with patience, if, perchance, the evil-doer may turn again unto Him. Behold, O man, the tender and infinite compassion of God. He suffers thee to break His Law, to deny His Existence, and to outrage His Creation; and yet He leaves to thee the comforts of life, and does not withdraw His benefits from thee; for He loves thee still, and pleads with thee, if only thou wilt repent and turn to the Lord thy God. See, thou selfish one, who art selfish because thou hast departed from the love of God, thou sayest to thyself, "*I am the centre of the universe, and there is none besides me. For me the earth moves round, and unto me all its riches ought to come. To minister to my wants, my comforts, my pleasures, my delights, my desires, it was, and is, and will be. For me the sun shines, the seasons roll, and the stars were set on high.*" And yet, with all this unspoken blasphemy daily manifested in thy life, it is only through the Mercifulness of God that thou, and men like thee, live on the earth.

God calls upon every faithful member of His spiritual kingdom to labour with Him in love for the subjugation of evil. And on every side we see that, with no uncertain progress, good is triumphing over evil. There is a more ardent love of knowledge, a keener appreciation of Nature, now than in the days of old. Men are more honest, more humane, more law-abiding. They have put behind them, in advanced communities, the beliefs in witchcraft and the evil eye; heretics are no longer harried to death; and if there be a growing distrust of religion, it is because there is more concern for truth, and the Truth is little seen in superstitious formularies and in wrangling creeds.

"Good is gradually gaining ground from evil, yet gaining it so visibly, at considerable intervals, as to promise the very distant, but not uncertain, final victory of Good," says one<sup>1</sup> who did not know the teaching of evolution, and who, without hope in the Providence of God or in the power of His Redeeming

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<sup>1</sup> J. S. Mill : *Essays on Religion*, pp. 256-7.

Love, declared that “to do something during life, on even the humblest scale if nothing more is within reach, towards bringing this consummation ever so little nearer, is the most animating and invigorating thought which can inspire a human creature.” And shall not we who have clearer light, and have experience of the Mercifulness of God, bear the olive-branch of mercy to others, that the kingdom of God may hasten to the full fruit of perfection, of which it once gave promise in the germ, and to which it is God’s Purpose that it yet shall come, though uprooted from its natural soil?

## CHAPTER XII.

### CONCLUSION

#### § 1. *The Teaching of the New Natural Theology.*

WE have now arrived at the end of our labours, and whether our interpretation of the universe be an idiosyncrasy or a faithful portraiture of its religious significance, it is for the public mind to judge.

There are, in the order of evolution, at least two ultimate principles, those of matter and mind. And though we dismissed as unprofitable the inquiry into origins, the problem presented by the connection between these principles probably admits, as we shall see in the Appendix, of a philosophical solution which, so far as it goes, is in harmony with the interpretation of the universe, at which we have arrived from the consideration of the processes of evolution. Natural theology, however, seeks for an interpretation of the universe in accordance with our knowledge of the universe; and it directs its attention to what is observed to occur in the processes of evolution, and not to the ultimate truths of the order of evolution. It builds upon scientific truths, and our argument began with the consideration of the process of Nature as manifesting character.

The first note of character which engaged our attention was a general one, prevailing in every process of evolution and throughout the whole order of evolution. The general process of Nature is an unchanging process persistently directed to the establishment of relations, both in the order of change of relations, and in the order of consciousness of relations; and in all four orders of evolution a more and more complex order of relations arises as the root-properties in each order separate,

and enter into extended relationship with their external circumstances. In all establishment of physical and protoplasmic relations—such as the relations of hydrogen to oxygen, of the sun to the planets of the solar system, and of the river to the mountain system of the earth; such as, also, the adaptation of flowers to the attraction of the insect tribes, of fishes to a life in the waters, and of land animals to the conditions of the land—an evolution of one set of relations from another takes place, in accordance with the laws of the physical and protoplasmic orders; and in all establishment of relations in the sphere of the consciousness of relations—such as the pleasures and pains, the instincts and intelligences of animal life—an evolution of one set of consciousness of relations from another, resulting in wider ranges of experience, also takes place in accordance with the laws of the mental and spiritual orders. This establishment of relations we found to be analogous to the establishment of relations on the part of the intelligence of man—such as the evolution of the steam-engine and other mechanical appliances, the development under cultivation of the forms hues and scents of flowers, the variation by artificial selection of various forms of animal life, and the training by education both of man's own intelligence and of the intelligence of the domestic animals. And from this analogy we were led to put the question whether, as intelligence is required for the evolution of relations on the part of man, it be not also required to account for the evolution of relations in the universe. In attempting to decide this question, however, on the strict lines of analogy, certain obstacles crossed our path. The intelligence of man acts by co-ordinating relations which exist potentially by virtue of the existence of their conditions; and in seeking to trace a similar co-ordinating power in the universe, we were met by the difficulties that the relations of the universe are interdependent relations, and that they are due to conditions of which the co-ordination could only be determined by the solution of the question of origins. These difficulties, however, in no way militate against the view that an Intelligence is operative in the evolution of the



relations of the universe. Nor do they indicate that the line of reasoning pursued was worthless. We know of no other agency than intelligence to which the establishment of relations can be ascribed, and our failure to discern that an Intelligence is operative in the co-ordination of the relations of the universe was due rather to the speculative nature of the problem which engaged our attention than to the invalidity of the line of reasoning followed. We cannot say that the analogy between the process of Nature and the processes initiated by man breaks down by reason of our inability to find, on scientific lines, the marks of intelligence in the co-ordination of Nature. There remains another direction in which the argument can be pursued. Man co-ordinates the relations of the universe to secure certain ends; and, following out the analogy in this direction, instead of looking for the evidences of an Intelligence in the co-ordination of the relations of the universe, we look for them in the end which the co-ordinated relations subserve. We come into view of this end, however, not as in the argument of design, by observing in particular pieces of mechanism the adaptation of means to ends, nor yet by reasoning from order to an end, but by discerning a purpose in the character of the processes which lead towards the end.

In addition to the general character of the process of evolution as an unchanging process, there is, in each order of evolution under the law of the evolution which conditions the scope and tendencies of the evolution, an unfolding of specific characters of just such a nature as suggests a purpose. And our inquiry became directed to the laws of the different orders of evolution with the object of ascertaining if a purpose can be inferred from the specific characters which they impart to the orders of evolution. From the consideration of these laws we built up our argument, and the steps of the argument by which we arrived at a purpose as manifested in evolution are as follows:—

First, the order of the physical evolution is progressive. It begins with an organization, an organization accompanies it and lies in advance of every stage of it; and it is so far

in agreement with the conception of a purpose that the process of its evolution points forward to an ultimate stage of organization.

Second, the protoplasmic evolution makes evident a power as controlling the adaptations of plant and animal life. The process of the evolution of life is that of a continuous adjustment of the root properties of life to physical relations, under a law of selection in which is represented the physical order; and the order of life is an order of interdependent relations established in accordance with a power prevailing in the physical order relatively to life. Life-forms are embodiments of physical relations and adjustments to the harmonies of the universe. But this, though suggestive of a purpose, carries us no further than the conception of a purpose, of which the end is conditioned by the material order; and the material order points to a time when all life will have died out. The purpose in life cannot, therefore, be the primary purpose of the whole order of evolution. And, at this point, as casting a side light on our argument, we may call attention to the fact, that it is for the most part in the relations and adjustments of life that the natural theologians, who look at the universe from the pre-evolutionary point of view, find the evidences of design. No doubt secondary purposes—relative, probably, to the order of mind—do exist in the adaptations of life. But, if we are to take these, as they are taken in the argument of design, to indicate a primary purpose, we necessarily bring the adaptations of life into immediate relationship with the purpose of God; and, being thus forced to look upon mind either as a part of life, or as subservient to life, we have open to us no way of escape from objections which, of no weight when the purposes in life are regarded as secondary, are of considerable weight when the purpose in life is regarded as primary. Life is under the government of the physical order, and partakes of limitations corresponding to the limitations of the physical order. The physical order in relation to life is adjustive and selective of the forms of life; and to whatever end the processes in life point, it is an end the conditions of which are already determined. The purposes prevailing in life are, in fact, such as

exist only in degrees limited by the material order; and all objections arising out of the material order with regard to their lack of wisdom, beneficence, or plan, are objections which must be seriously considered. The material order manifests relatively to life a want of general beneficence, and is incapable of giving a true harmony to mind; and if a primary purpose, limited by the material order, be supposed to exist in life or mind, it could only be ascribed to "a Being either limited in power, or limited in goodness." Not unless we come into view of an order of relations, with regard to which the law of the evolution is other than adjustive to material relations, and other than selective with reference to an end circumscribed by material conditions, can we, in view of the limitations of the material order, infer a Divine Purpose.

Third, evolution teaches us to regard life and the physical order as together subservient to mind. The physical order is educive of mind as a conservative factor of life, and as a bond of union between individuals; and it is also directive of it towards the attainment of such a consciousness of relations as enables it to realize the universe as an object of thought, and as the sphere of its own pleasurable activity. These educive and directive characteristics point to a primary purpose prevailing with regard to mind. And we note, as emphasizing a purpose in mind, that the dispositions of the universe, which make evident a want of beneficence relatively to life, are in relation to mind further educive and directive of it. The struggle for existence is the schoolmaster of mind; and what appear harsh in this struggle, relatively to life, are, as it were, the birth-throes of mind. Pain, also, an element of the mind's own order, is in relation to man and the physical order, a condition of existence which calls out the higher mental and moral attributes of man. This view of purpose, however, as prevailing in mind, is insufficient in itself to lead us to infer a Divine Purpose. If the processes, which are educive and directive of mind, be educive only of utilitarian elements, and directive of mind only to material correspondences, the objections derived from the material order with regard to a primary purpose as manifested in life, apply also to the purpose as

manifested in mind. And to complete our argument, we must discern that the end, to which the purpose in mind is directed, is not an end which is determined by the conditions of the material order; that is, we must prove that the laws of evolution, operative in the order of consciousness of relations, are educive of more than utilitarian elements, and directive to other than material correspondences, or, in other words, we must show that the adjustments of mind transcend the sphere of the physical order.

Fourth, in the spiritual order of evolution we have sentiments which transcend the sphere of the physical order, and which are governed by a law independent of the physical order. Our love of knowledge for its own sake, our delight in beauty and awe at the sublime, our inward monitions of a moral law, and our feeling after God, are all more than utilitarian adjustments, and all transcend the sphere of the physical. They are also all governed by one and the same law of sympathetic relationship; the sympathetic accord between the mind and the external universe gives birth to the intellectual love of knowledge, and to the æsthetic appreciation of Nature; and the sympathetic accord between the mind and an internal order of spiritual relations gives rise to the moral law and the recognition of God. For this law of sympathy there is no place in the material order of things. By it we are carried outside ourselves into sympathetic union with all things, and with God; and we arrive at a full and clear conception of an order of relations, the conditions of which are not conditions of the material order, and the purpose in which is not limited by the material order. We, therefore, escape from all objections that arise out of the character of the material order. And the words of Lucretius—

*“Quod si jam rerum ignorem primordia quæ sint,  
Hoc tamen ex ipsis cæli rationibus ausim  
Confirmare, aliisque ex rebus reddere multis,  
Nequaquam nobis divinitus esse paratam  
Naturam rerum; tanta stat prædita culpa.”*—

can be no more applied to the universe. A purpose prevails in evolution with regard to a sphere of spiritual relations, and in

our view of the Divine, we are carried above the system of things as they are seen through the material order. The direction of this purpose is towards the establishment of a spiritual kingdom, and the faultiness of the material order, if it really exist, must be interpreted, not as limitative of the Power or Goodness of God, but as in some way subsidiary to the Purpose of God.

The character of the order of evolution, moreover, in which this purpose is manifested, makes it unnecessary that we should continue the argument in proof of an Intelligence, and fit the idea of purpose into its place as enabling us to demonstrate that an Intelligence is operative in the universe.

The character of the spiritual order of evolution in itself enables us to interpret the universe. The very fact that there is a spiritual order of evolution proves that there is a fixed order of relations of which the spiritual in man is interpretative.<sup>1</sup> And we have demonstrated that this fixed order of relations cannot belong to the sphere of the material order.<sup>2</sup> The evolution of the spiritual is a proof of the existence of a spiritual order of relations. And just as the adjustments of life are embodiments of physical relations, so are our spiritual attributes manifestations of spiritual relations. The law of sympathetic relationship under which is evolved all that is spiritual in man, belongs to the union of the spiritual with the Divine. And our spiritual attributes are themselves witnesses to the spiritual and to the God who is the Source of both matter and spirit. Our sympathetic union with Nature, by means of the love of knowledge and the æsthetic sentiment, is evidence that, through Nature, we enter into contact with Something capable of answering to the sympathies which go out from us towards Nature. This Something must be spiritual, and our sympathetic union with Nature proves Nature's union with the Divine, and enables us to infer that the Creator of the universe is immanent in His universe. Also from the law of sympathy, as manifested in morality and religion, we infer the Moral Attributes of

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<sup>1</sup> See Chapter viii. § 1, pp. 201-203.

<sup>2</sup> *Ibid.* §§ 5, 6, and 7.



God and the existence of the spiritual kingdom. Our moral attributes are spiritual attributes, and must belong to the Father of spirits. And our reaching out towards a Divine Spiritual Something, which answers to what in ourselves is spiritual, assures us that we are members of the spiritual kingdom of God.

Such is, in outline, the constructive part of our argument. We have questioned the evidences which point towards design, but we have maintained the teleological character of the order of evolution. In the order of evolution there is, as Fiske says, "a discernible dramatic tendency,"<sup>1</sup> and throughout all its four stages, which interpenetrate and overlap each other, there is a progression which advances in unchangeable order as internal become adjusted to external relations. We see the Purpose and End of evolution becoming clearer as we ascend from matter to protoplasm, from protoplasm to mind, and from mind to spirit. The physical orders manifest to us a power, and the spiritual a spiritual kingdom. And man, the crown of creation, looks up to God, and reaches forward, in the hope of a perfect life, to the Beatific Vision of God.

We turn no longer in a timidity of spirit, that betokened our distrust in our intuitions, to outward things for evidences of design. The evidences of God and of the ways of God are within us. But the universe speaks to us still of the wonderful order of the process of evolution. And because we have ascended to the recognition of the manifestation of God in the sympathetic law of our own intellectual, emotional, moral, and religious being, the midnight heavens are not less glorious, nor the fair face of the earth less suggestive of God. By our own spiritual intuition we see God everywhere. And if we are at present unable to read the Purpose of creation other than as it applies to man, we are not the less sure that in all God's Works a Purpose must exist.

The human mind, however, seeks to harmonize one truth with another, and to attain to a view of things in which all related truths are contemplated as a systematic whole.

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<sup>1</sup> *The Idea of God*, p. 159.

And it is a test of the fertility of a conception, and generally also of its worth, if, when placed alongside of other conceptions, it is capable of leading to the discernment of new truths. Valuable verifications of our conceptions as truths are also arrived at when they harmonize with our general view of things and light up much that was previously obscure. And just as in scientific investigations, where experiment can be applied to verify conceptions and decide between rival hypotheses, tentative hypotheses are formulated to bring into one view facts of which the true theory awaits discovery, so also in other directions, in which experiment is not available, systematic arrangements of ideas are nevertheless sought for in which the mind, partly with the object of reducing to order its conceptions, and partly for the purpose of verification, endeavours to arrive at definite conclusions by the elimination of the self-contradictory hypotheses, or, where this cannot be done, by striking a balance in favour of the hypothesis which best harmonizes its conceptions. Indeed, in respect of many matters the human mind is compelled thus to systematize its view of things, and in none more so than in its interpretation of the universe, in which it arrives at conclusions which are of practical value in the conduct of life, and which must be extended to cover the principles which regulate life. We have, therefore, in conformity with this procedure of the mind, advanced our interpretation of the universe so as to take a systematic view of it in its relation to things in general.

We have arrived at an interpretation of the universe, in which purpose is predicated to prevail with regard to a sphere of spiritual relations governed by a spiritual law, and we view this purpose as directed to the establishment of a spiritual kingdom. The spiritual law and the spiritual kingdom are facts vouched for by the order of evolution. And from these facts we have deduced a definite view of the Providence of God. A Providence actively operating in the universe is the natural demand of the spiritual kingdom, and a fair inference from the existence of purpose in evolution. There are certain facts, however, relating to the spiritual condition of

man, which raise difficulties with regard to the acceptance of such a Providence; and we are led further to supplement the doctrine of the Providence of God by the hypothesis of the Fall of man, and by the doctrine of the Mercifulness of God. Nevertheless, we are conscious of a baldness in our statement of the Fall, and of its relation to the Mercifulness of God; and it is questionable if natural theology be able to do more than make probable the hypothesis of a Fall, and be not forced to leave to Revelation the task of justifying relatively thereto the ways of God to man.

But for the lurid light cast over the universe by the spiritual condition of man, we might possibly have been able to behold it glorious and resplendent with the Presence of God; and though the doctrine of the Mercifulness of God clears away the gloom, and reveals God to us in a mysterious depth of love and compassion, yet, look at it how we may, the spiritual condition of man is a grave perplexity. The Fall obscures our vision, and makes a harmonious view of things doubly hard to attain, and spiritual truths find a less ready welcome where they encounter a spirit of opposition to God. There are also questionings to be stilled—questionings all the more peremptory because we ourselves are men. We may reflect on our present life, realize its transitoriness and unsatisfactoriness, and speak with fervour of an after-life of continual blessedness that awaits us; but we question if there be any man who has meditated deeply on the mystery of life, who has ever realized the conception of an after-life with feelings other than of dread, or who has not felt that, in a perfect evolution, his present sphere of life ought to have contained all that is required for his peace and well-being. Our dulled sense of responsibility makes us little capable of realizing the mysterious life to come, and, still less, the awful majesty of God; and were it not that the cold material order creeps with freezing chill over our aspirations, we might never feel much of the unsatisfactoriness of our lives. Again, we may realize that we are fallen creatures, but this, in turn, introduces us to new doubts and questionings. Was man free to fall? And fallen, is it only through the lower and harsher law of life that he can win again his way to God?

One of two views we must accept. Either that man has been left to himself by God, or that he is in a fallen condition, and relies on the Mercifulness of God to rescue him, and finally restore him. The former view is contradictory of all that the order of evolution teaches us with regard to Purpose in evolution, and the existence of a spiritual kingdom. And we have advanced much to show that the belief in the Fall is a reasonable belief. Perhaps the most serious objection to the Fall is that which arises out of the presumed existence of physical evils; and when, from the point of view of life, we behold the warfare of one form of life against another, and mark to what an extent life preys on life, the system of things does appear harsh and cruel. But from this standpoint we confuse life with mind, and draw inferences from facts which belong to life, as if they were facts which belong to mind. Pain and suffering are not vital, but mental, facts; and the significance of pain and suffering must be judged from the point of view of mind, and not of life. Pain in relation to mind is not in itself an evil, and for all sufferings compensations may exist, either in this life, or in a life to come. Moreover, in judging the matter from the point of view of mind, our standard of suffering must not be man's capacity to suffer. The sufferings of an animal are proportional to the degree of mind manifested by the animal; and, giving to this its due weight, it is in every way probable that only with reference to man, and in connection with man, can we find anything worthy of the name of physical evil. But physical evil, in reference to man, cannot be regarded apart from the moral evil in man, and it is not improbable that the moral evil in man is the cause of physical evil; and to the considerations we have already advanced in support of this view, we may here add those which we derive from the view which Purpose in evolution leads us to take of an Intelligence as operative in the universe.

If, from the general process of Nature, we infer a Purpose, and therefore an Intelligence, we must carefully guard against any preconceived ideas derived from our view of Nature as a product, and still lingering in our minds, insinuating themselves into our view of things, and so influencing us that we take a

mistaken view, and find a place for this Intelligence only in originating the order of evolution. The doctrine of the Divine Immanence teaches us that the God who is immanent in the universe must not only be the Creator of it, but must also preserve it, and rule over every advance in it. The relations established in the processes of the physical and protoplasmic evolutions are certainly interdependent relations derived from a primary form of relation; but, somewhere in the lines of both the physical and protoplasmic evolutions, there must be, securing the continuous differentiation of the physical and protoplasmic orders, an establishment of relations by changes of relation, which is directive of the process of Nature, and in the train of which all other changes of relation follow; and no other view than that these, at least, are guided by an Intelligence, can agree with the conception of Purpose in evolution, and give adequate expression to the doctrine of the Divine Immanence. The uniformity of Nature is usually contemplated as a cold and passionless expression of law, and in the physical and protoplasmic activities which are due to established relations, it appears superfluous to suppose that an Intelligence is operative. The sun is hotter than the space that surrounds it, and the radiation of heat inevitably occurs; the earth moves in its orbit round the sun, in accordance with fixed laws of motion; glaciers grind their way down into the valleys by virtue of their gravitation; the primitive free-swimming forms of life, tossed by the waves, fixed themselves to the shore, and a whole kingdom of life finds it advantageous to be imprisoned in strong resisting walls; the crab creeps over the rocks, and natural selection has arranged that it carries a hard skeleton on the exterior of its body; and a mammal finds its way into the sea, and becomes adapted as a bygone ancestor had been adapted to a life in the sea; and these, and the other resultants of fixed relations in the physical and protoplasmic worlds, we are apt to regard as purely mechanical. But if we attentively consider the process of Nature, we shall observe that, in the physical and protoplasmic orders of evolution, there is no change of relation which, however in accordance with law and order, is not a further evolution of physical or



protoplasmic relations, and as such contributory to the Purpose in evolution, infinitesimally, it may be, but not the less truly. Changes of relation must therefore, directly or indirectly, be due to intelligence. Nature is a process of establishment of relations, and intelligence, we know from the case of man, to be an agent in the establishment of relations; also no other means of establishing relations can be conceived than intelligence, and, as the existence of a Purpose in evolution proves that an Intelligence is operative in the universe, it is a fair inference that this Intelligence presides over the process of Nature, and governs its establishment of relations. The continuity of Nature is a very abiding Act of God, and its uniformity is nothing more than an expression of the unchangeable Will of God.

This view of the action of an Intelligence makes it conceivable how the order of evolution may have been affected by the Fall of man. The energy of the universe continues to be dissipated, and the life of the earth tends to ultimate death; parasitic organisms live and flourish, and man is engaged in a perpetual warfare against their ravages; and these and the other dispositions of things, in which physical evil may be thought to reside, we have ascribed to the moral evil in man, and the consequent withdrawal of spiritual influences from the earth. Man himself is an intelligent agent of change, and our view of an Intelligence as operative in the universe, must be modified by the fact that the establishment of relations by changes of relations becomes, in a certain limited sphere, the work of a subordinate intelligence. If, then, the action of man's intelligence in producing change be not in agreement with the Will of God, the changes produced cannot be in accordance with the Purpose of God. And as there must be, according to the Purpose of God, a certain order of relations between the spiritual and physical orders, appropriate to them and necessary to the spiritual evolution, this order of relations must have been perverted by man; and this perversion, by the multiplication of its effects, may well account for all that we now observe. Man, by virtue of his intelligence, affects in some degree, by each of his actions, the trend of evolution; and many of the changes in Nature

produced by man, at first inconspicuous and apparently trivial, have been pregnant with momentous consequences. It was a small thing for a Scotch colonist to import into Australia a few rabbits, to remind him of his far off home; and yet the marvellous fecundity of the few rabbits he imported brought about the destructive rabbit pest in that country, and caused incalculable loss to agriculture. And we may well conceive how the declension of man from the spiritual law of his being has acted with disastrous effect on both the physical and protoplasmic worlds. We notice to what an appalling extent the action of man's intelligence is either directly or indirectly occupied with the evolution of physical relations which are simply engines of destruction. He recovers, indeed, much of the energy dissipated in the past by raising from the bowels of the earth the mineral that, in primary ages, formed part of the vegetation of the earth; and much of this is used to secure his material comfort, but much also is used in smelting and preparing the iron and steel for munitions of war. Again, many of his contrivances are rich in blessings, but many also are so abused that they become little short of curses, such as his beer vats and whiskey distilleries, his racecourses and roulette tables. The Eden man lost was the spiritual power to work in harmony with God, and secure the due perfection of both his own evolution and the general order of evolution. And the shadow of his Fall rests heavily in many respects on the lower creation. There is scarcely a form of life whose conditions of existence have not been affected by man, and, if he has been unable to secure his own true interests, it is not probable that he has been able to direct his intelligence to subserve the interests of the lower animals. Probably also the shadow of his Fall rests on the physical universe. Given that the trend of the physical evolution is directed by the Intelligence of God, in harmony with His Purpose, a declension of the physical evolution from its destined course must have been brought about, indirectly if not directly, by the declension of man from the spiritual law of his being, through which is fulfilled the Purpose of God. Much of man's intelligence,

as we have incidentally pointed out, is directed to the recovery of the energy dissipated in the past, and it may be the true office of man's intelligence, working in harmony with the Will of God, so to direct the order of physical evolution as to have control over the dissipation of energy. Also, the physical evolution may have continued its course on the lower plane, through no other cause than that the Fall of man brought with it the withdrawal from the sphere of the physical of the co-operation of the Intelligence of God with the intelligence of man.

To have an assured belief, however, in the Fall and in the Mercifulness of God, these beliefs must be verifiable beliefs. We may reason out the antecedent conditions of the Fall by reflecting that if there had been no freedom of the will there could have been no spiritual evolution and no creature capable of loving its Creator; the sympathies of God could never have extended themselves through the universe to intelligences sharing in His knowledge and interpreting the emotional significance of Nature; nor could the Divine image have been manifest in beings possessed of moral attributes and the sense of things spiritual. And we may find a measure of verification of the fact of the Fall in every human breast. There is no man whose conscience can acquit him of wrong; none of us are in any conspicuous degree pure, holy, truthful, and good; all are conscious of the conflict within of spiritual aspirations with material interests; and we doubt if there be any man who is complacently content to take his share of evil as a result of the brute inheritance, and to cease to struggle against it as an unspiritual view of the universe would logically constrain him to do. So we may reason and seek for verifying facts. But to attain a complete and full verification of all that is demanded by natural theology to reconcile the Providence of God with the spiritual condition of man, a Revelation is indispensable. Indeed, it is possible that an inversion of this statement is nearer the truth, and that we ought rather to say that Revelation alone can make clear to us the Fall of man and the Mercifulness of God, and that natural theology can, in these matters, do no more than verify revealed truth.

We incline, however, to the view we have made prominent throughout this treatise, that the broad lines of the relationship of man to God are in this age—whatever they may have been in the past—discernible from the testimony of Nature to God. There is in the order of evolution an evolution of relations which is not under the control of the physical order, and the sentiments belonging to this evolution of relations must be dependent on fixed relations. The order of evolution, therefore, makes known to us the fact of a sphere of spiritual relations. From this fact there follow certain deductions which rigorously lead us to the conception of the Fall and to the Mercifulness of God as directed to the rescue of man from the consequences of his Fall. And the answers which the inspired prophets and teachers of God give to the great problems of human life can in this age—though in previous ages their voice was the voice of Authority addressed to faith—be viewed as confirmations of the dictates of the spiritual in man. The teaching of natural theology and Inspiration are in accord; and if natural theology must go to Inspiration to be taught how the Mercifulness of God is related to fallen man, it at the same time not only confirms but also is confirmed by the Inspired Word of God.

We may even go further, and, from the point of view of our natural theology, argue that there must have been a direct revelation of God and an inspiration of holy men by God. Man, by disobedience, cut himself off from God; and the creature could not become the Creator, and restore himself. When the law of sympathy was broken by man—and the breaking of this law must have been infinitely more disastrous in its consequences than the breaking of any of the secondary material laws—the communion of man with God must have been destroyed; and no way of return to man was possible except through the God against whom he had rebelled. The restoration of the spiritual law and of communion of God could only take place by the illumination of the mind of man by God. The record of Revelation is the record of God's means of restoration. And if men, from a pre-evolutionary view of the universe, could infer that the conception of an Intelligent

Author of Nature made probable a Revelation, much more may we infer its probability—and even its necessity—to restore our blinded sight and recreate and lead onward to its full perfection the spiritual kingdom of God.

§ 2. *Its Message to the Age.*

Man ever thirsts for closer communion with God; and each age has its own special needs, which God meets not only by the revelation of Himself, but also by the evolution of clearer views of the Divine in natural things. And if we are asked how shall we now, through Nature, attain to closer communion with God? We answer—by cherishing the spiritual, teaching men to love knowledge more than riotous sports and frivolous amusements, leading them to the communion with Nature and to the interpretation of her manifold moods, elevating them to higher moral ideals, and inspiring them with faith in the Providence who works by love, and whose tender mercies are over all His works. And in an age in which the materialism of life is so absorbing, when on every side the comforts of life increase by leaps and bounds, and the race for wealth is keen and exciting, what can be a better tonic than deep and copious draughts from the fountains of knowledge and Nature, or possess more healing virtues than the sympathetic balm that binds a man to his fellow-men and to his God?

The order of evolution is progressive; and let us also learn that to be truly in accord with evolution we must be progressive in our conceptions of God. To repose trustfully on old conceptions is to sow the seeds of degeneration; to reach forward to new is to acquire a larger life. Beliefs change from age to age; the thoughts of yesterday are not the thoughts of to-day; and, though we must ever have convictions which give meaning to life and inspiration to the soul, to seek for these amid the decaying ruins of the past is to make life a dream, and the soul gnarled and dry as the trees that wear out a withered existence between the tumbled stones; while to project the mind onward in search of the freshest and most vigorous conceptions of God is to make life full of energy, and



give to the soul the inspiration to mould and invigorate the aspirations of the mind. No evolutionist can look backwards except to correct by the experience of ages the first crude impressions of newly-discovered truths. To new truths he must ever be faithful. There is gold in them, pure and undefiled, that will purchase for him a richer banquet of spiritual delights. Already now he apprehends the spiritual kingdom; and recognises, through the obscuring clouds of evil, the Providence and the Mercifulness of God. And each new truth will carry him onward to clearer vision and deeper thoughts of the Divine.

Moreover, let us not forget that natural religion itself is a matter of evolution, and that the love of knowledge to bring clearer conceptions of God, the æsthetic sentiment to warm and vivify our spiritual life, and morality to strengthen our union with the Divine, are all needed for progress Godward. If any spiritual attribute lie bedridden in the soul, we must suffer loss in spiritual things. Do we neglect knowledge, our religion becomes superstition; feeling, it hardens into dogmatism; morality, it sinks into antinomianism. Do we cultivate knowledge alone, it is lost in abstractions; feeling alone, it degenerates into sensuousness; morality alone, it becomes creedless.

And not the least important of the uses of natural theology, in ages such as the present of warring sects and disputed creeds, is that it leads the way to common conceptions of God. Nature is a mode of revelation of God that comes to all equally, because of our common education in the things of Nature. The personal factor in religion is reduced to a minimum. And however we differ in other respects, we can all join in the dispassionate interpretation of the universe; and the interpretation we find, not distorted by individual bias, can be received in common by all.

Individually, we suppose, it is a minor matter how we apprehend God, so long as we apprehend Him in such a manner as to be in full communion with Him. But since our views of God are a matter that affect society, since our individual views of God re-act upon those of our fellow-men,

and theirs on ours, individual conceptions of God ought to yield to general; and as members of society we are bound by the sympathetic law to seek common ground with our fellow-men in our views of God.

No man has a right to private views on religious matters. He does wrong to his religious sentiment when he shuts himself out from the growth in clearness of vision of God which comes from spiritual communion with other men. He breaks the first and cardinal law of the spiritual kingdom; and his religion ceases to be religion and becomes spiritual pride. Instead of being sympathetic, it becomes self-regarding; instead of reaching out to God, it ministers to self-love.

We all indeed have a right to private judgment. No one can override the spiritual entity of the individual. But if our spiritual nature be true, and truly moved by the sympathetic law, there will be no crotchets treasured up in the mind, no morbidity of temper prevailing in our views. By the very law of sympathy we are moved to unity. And while it is true that all men cannot think alike, and that to force the conscience of any one is to destroy it, it is at the same time true that there are universal spiritual truths which ought to be apprehended in common by every mind. God is, in His essence, One and Indivisible; and if differences in apprehension of Him exist, it can only be through differences of spiritual insight; and to perpetuate these differences, when we might have closer union, is to take away from our spiritual nature one of the conditions of its growth. When men differ, it is possible that all may be wrong, it is not possible that all can be right; and the spiritual kingdom will ever lack one of its crowning perfections so long as men hold themselves apart and refuse to recognise that God and the eternal ways of God are to be perceived with as common a mode of apprehension as we perceive the action of the forces of Nature and the virtues of love, honour, and goodness.

The God that Nature reveals is the God of the Christian, the Creator and Sustainer of the universe, the Saviour and Redeemer of mankind, the Guide and Comforter of the souls of men, a God of love and of mercy. And to the various

Christian communities with their peculiar fabrics of faith, the revelation of God in Nature speaks out for unity with a compelling voice. He is a God who calls upon the Catholic, whether Anglican, Greek, or Roman, to recognise that His mercy is not bound and conditioned by dogmas, however true those dogmas may be. He is a God who calls upon the Protestant to learn that the Lord's face is not turned away from any man who has true sympathetic motions, and that to be in communion with God it is not necessary to presumptuously declare our assurance of salvation. He is a God who calls upon the Rationalist to reflect that after all the revelation of God in Nature is not the foundation of religion, and that room is left for the God of miracle and of prophecy; that the sympathetic law of the spiritual kingdom demands that God should cherish the spiritual, and, if need be, protect it under all circumstances and conditions; and that the temple and song of creation do not dispense with the ministrations of Mercy and the spiritual manna that rains from the Word of God.



## APPENDIX

### THE PHILOSOPHY OF MIND

#### § 1. *The Problem left by Kant.*

HUMAN Reason, when divorced from her Divine Lord, was left with two daughters for her comfort. And the elder, Philosophy, being of a managing disposition, at once assumed control over the household. For long everything was done at her bidding; and under her management Reason lived contentedly enough until she observed how much more vigorous and useful her younger daughter Empiricism had grown up to be. Since then, the elder daughter has been regarded very much in the light of an encumbrance, and has more than once been led out over the threshold and solemnly bidden to depart, never to return. Yet somehow Philosophy never goes; but, quietly stealing back, and avoiding for a time her mother's eye, she reassumes the direction of the house. For though her fingers are of the clumsiest, her younger sister without her is but a sorry creature. And whatever things both outside and inside the house are tasteful and valuable, these though executed by the younger have been designed by the elder. With the deftest of hands and the nimblest of feet Empiricism has no originality; and even the bucket she manages so dexterously in drawing water from the well was not her contrivance. Reason, however, has had no suspicion of this until just the other day some glimmerings of the truth began to dawn upon her, when the eight-day clock had gone wrong, and she found her favourite daughter unable to set it right without the help of her sister. This surprised Reason much; and she has since



been seen to regard Philosophy with kindlier eyes; but, being somewhat opinionated, it will probably be some time yet before she quite loses her antipathy towards her, and fully and frankly acknowledges her worth and value.

The moral of this apologue is that we cannot do without a philosophy of first principles, apart from which even the knowledge gathered by the inductive method is unscientific. What is popularly termed scientific knowledge is the knowledge of changes, and of how one change is related to another; and this knowledge to be possible must take for granted certain philosophical postulates. And what is commonly called the experimental philosophy is, strictly speaking, not a philosophy at all, but a method whose concern is not with principles, but with ways and means of inquiry. We interrogate Nature by the methods of observation and experiment, because as we are taught by philosophy Nature is an order of change to which these methods can be applied. By the methods of observation and experiment alone we can no more arrive at the conviction that Nature is a system of order, than we can by measuring or constructing the angles of innumerable triangles arrive at the conviction that in every triangle the three angles are together equal to two right angles. A physical science, as is well-known, never passes beyond the classificatory stage until it has practically become a branch of mathematics. And in every true experiment we approach Nature (as Kant observes) in the character of a judge; instead of sitting humbly at her feet to learn her secrets, we demand her answer whether her order is such as we have already anticipated it to be.

And not only is the experimental philosophy no more than a method of inquiry, but as a method of inquiry it is rigidly applicable to its own appropriate body of facts, and to no other. It is just as reasonable to hold that the telescope of an astronomer, the battery of an electrician, or the test-tube of a chemist, is each one by itself an instrument to unlock every secret in the universe, as it is to hold that nothing can be known apart from the inductive method. Every branch of knowledge has its own distinctive means of research, peculiarly

appropriate to itself, and progress is never made in any science until we apply to each distinctive order of facts the appropriate means of research.

The body of facts to which the experimental method is appropriate are the facts of change. And if there be orders of facts in the universe which, though connected with change, do not themselves belong to the order of change, then, though we may apply the experimental method to ascertain their connections with change, we cannot apply it to the elucidation of the facts themselves. We observe changes of relation, and apply experiment to determine the connection between changes of relation. But to extend the methods of observation and experiment to whatever is not subject to change is as irrational and as unavailing as the attempt of the ancient Greeks to make motion a branch of Euclidean Geometry. And to insist on so extending it, as materialists do in the case of the root-properties of mind, is practically to cease to follow any method of inquiry at all, and to incur labours as bootless as if with the object of ascertaining its contents, a geologist were to tap with his hammer at the human head, and gravely pronounce that it gives forth a hollow sound.

We cannot gauge mental manifestations by experimental rules, except in so far as they are connected with the changes of relation which precede or attend them. To arrive at a true knowledge of mind, we require some other means of research than that which is appropriate to the inductive sciences. And nothing more is demanded to make our knowledge of mind as assuredly scientific as our knowledge of changes of relation, than that investigators should lay hold of the right method of research, and follow it out with zeal and fidelity.

The scientific study of mental manifestations may be said to have begun with Locke, but, though he himself appears not to have known it, nor yet his followers, Locke's adventures in the hitherto unexplored territory of mind were little more than a series of helpless flounderings into its bogs and morasses. The bogs, however, in which he fell, and into which Berkeley and Hume followed him, have been surveyed and made passable by

the illustrious Kant; and anyone who is humble enough to take Kant for his guide may pass safely through the land, and it will be his own fault if he returns with a despairing account of it.

When Kant put the question of a criterion "by which we may securely distinguish a pure from an empirical cognition," he was knocking at the door which opened to show him the true method of enquiry into the secrets of mind. He found that what pertains exclusively to mind is marked by what no change of relation can be marked by—necessity and strict universality. And with these criteria as guides, he proceeded to map out the domain of pure mind, and bequeath to the evolutionist of a later age—for Kant himself was a seer of the doctrine of evolution—the interpretation of his labours.

Our knowledge, says Kant, proceeds from two main sources in the mind, the faculty of receiving representations, and the power of cognising by means of these representations. The former is called intuition, the latter conception. Through the one an object is given to us, and through the other it is, in relation to the representation, thought. Both are empirical, or pure; empirical when sensation is contained in them, and pure when no sensation is mixed with the representation. And just as when we rise from a mere sensation to the perception of an object, a triple synthetic process takes place in the mind, so is there, says Kant, in the sphere of pure intuition and conception, a corresponding triple synthesis, by means of which objects are cognised *a priori*, and experience itself becomes possible.

The pure intuitions and conceptions relate to the form in which something is represented and thought. And through them Kant affirms the mind to be in possession of certain keys to possible experiences. Our knowledge, he says, begins with experience, but does not all arise out of experience; the matter is given *a posteriori*, the form is given *a priori*. And the exact significance of his position is, perhaps, best shown by a statement of the points in which he considered the philosopher Hume to be in error. Hume inherited the view of Locke, that nothing which pertains to the objects of the understanding is

innate. And though he was probably aware, says Kant, that we proceed in judgments of a certain class beyond our conception of the object—such as when we hear a shriek and look round for the cause of it—he did not distinguish that we can proceed beyond a conception, and extend our cognition *a priori*. On the contrary, proceeding on the canon that “no faculty of the mind can conduct us from the conception of a thing to the existence of something else,” Hume regarded the augmentation of conceptions independently of experience as altogether impossible. Hence, he held the *a priori* principles of the human understanding to be invalid and imaginary, and to be but subjective habits of thought originating in experience. But, says Kant, although we never proceed *immediately* beyond the conception which is given to us, we can always cognise completely *a priori*, in relation to a third term, namely, possible experience, the law of its connection with other things; and Hume was wrong in inferring, from the contingency of the *determination according to law*, the contingency of the law itself, and in confounding the passing beyond the conception of a thing to possible experience with our synthesis of objects in actual experience, which is always, of course, empirical.

In the triple synthesis necessary for the *a priori* cognition of all objects, the first thing which must be given to us, according to Kant, is the diversity of the pure intuition; and the second is the synthesis of this diversity by means of the imagination; but these give, as yet, no cognition. The synthesis is the mere operation of the imagination, “a blind but indispensable function of the soul, without which we should have no cognition whatever, but of the working of which we are seldom even conscious”; and the third thing which gives unity to it is an act of the understanding in which representations are conjoined. The conjunction of representations is not to be found in the objects themselves, nor can it be borrowed from them by perception. It is, on the contrary, an act of the understanding in conjoining *a priori*, and bringing the variety of given representations under the unity of consciousness. And the third and final requisite for the cognition of an object, is the act of the understanding in submitting the synthesis of the diversity

of the pure intuition to the unity of consciousness. The understanding is the faculty of judging; and, in the act of conjunction, all the manifold "in one empirical intuition is determined in relation to one of the logical functions of judgment," by means of which it is unified in one consciousness.

Kant assumes that the logical functions of judgment, as exercised in the ordinary operations of mind, hold good also of the operations of pure mind; and, taking the four heads of quantity, quality, relation, and modality, under which we distinguish the intellectual form of a judgment, he analyses each into three momenta, and arrives at twelve categories which, viewed as predicables of the pure understanding, form the pure conceptions of the understanding. These pure conceptions are predicates of possible judgments relating to some representation of a yet undetermined object; and their validity rests on the fact that experience is possible only by their means. They are forms of thought, and only through them can an object of experience be thought.

And with regard to the great question which Herbert Spencer says psychology is called upon to answer—that is, to take the concrete example Spencer himself adduces, how the visual image of a peach and the notion of sweetness, each corresponding to something external, of which they are the representations, become conjoined with the conjunction of the externals into the cognition of the external object, a sweet peach—Kant tells us we can never represent anything as conjoined in the object without having previously conjoined it ourselves. Conjunction is a purely spontaneous act of the understanding, and takes place by means of the principle of the original synthetical unity of the manifold in the act of consciousness, which principle is the first pure cognition of the understanding. "I join," says Kant, "one representation to another, and am conscious of the synthesis of them";<sup>1</sup> and "a judgment is nothing but the mode of bringing given cognitions under the objective unity of consciousness."<sup>2</sup>

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<sup>1</sup> *Critique of Pure Reason*, "Transcendental Logic," First Division, § 12.

<sup>2</sup> *Ibid.* § 14.



Thus Kant traces out for us the elements that go to make human experience possible, and leaves us with the problem of accounting for them as facts of the order of evolution. It is quite true, as Kant contends, that the understanding makes the world, but it is yet to be determined whether the world was first operative in making the understanding.

The understanding can cognise nothing which does not admit of reduction under the categories; and Kant himself puts the question—how is the application of the categories to phenomena possible? The pure conceptions of the understanding, he says, can never be discovered in any sensuous intuition, and he concludes “that there must be some third thing which, on the one side, is homogeneous with the category, and with the phenomenon on the other.” This third thing he arrives at by reflecting that in respect of time, that is of that which “determines the relation of representations in our internal state,” the pure *a priori* conceptions must contain *a priori* formal conditions of sensibility; and these in turn the general condition under which alone the category can be applied to an object; and thus, he says, “an application of the category to phenomena becomes possible by means of the transcendental determination of time, which, as the schema of the conceptions of the understanding, mediates the subsumption of the latter [the phenomena] under the former [the category].” The mediating representation is in Kant’s system a schema, and the procedure of the understanding with regard to the various schemata he calls the schematism of the understanding. These schemata are pure, and contain no empirical element; and by means of them the images of objects first become possible. “It is not,” says Kant, “images of objects, but schemata, which lie at the foundation of our pure sensuous conceptions. No image could ever be adequate to our conception of a triangle in general,” which includes under itself all triangles; and “still less,” he continues, “is an object of experience, or image of an object, ever adequate to the empirical conception.” The conception always “relates immediately to the schema of the imagination, as a rule for the

determination of our intuition, in conformity with a certain general conception." Such is Kant's view; and, in relation to the categories, he specifies number as the pure schema of quantity, the continuous and uniform generation of the real in time as the schema of reality, the permanence of the real in time as the schema of substance, and existence in a determined time as the schema of existence.

Now undoubtedly, in the manifestations of mind, as they obtain in the order of evolution, the schematism of the understanding, assuming Kant's view of it to be correct, exists in various degrees of completeness. Number is very imperfectly realized by the lower races of men; a baby is utterly unconscious of many classes of objects which solicit the attention of its elders; and whole fields of human experience are closed to organisms of limited range of sense. Moreover, the schemata appear to be connected with the brain in such a way as to be subject in particular directions to the process of degeneration, as is manifested in man by the loss of the sense of direction possessed by many of the lower animals; and it is not improbable that the assumption of the upright position by the immediate progenitors of man was attended by considerable changes in the co-ordination of the mind to the outer world. We may venture then to say that the schemata are to some extent, at any rate, products of evolution in the domain of pure mind which, under appropriate conditions of evolution, render possible the application of the understanding to the field of its perceptivity. We may even go farther, and speculate that the intuition of space, though regarded by Kant as a primitive datum, is, in our form of it, a product of evolution not altogether remotely related to the evolution of the schema of number. Our consciousness of space of three dimensions is resolvable into the ability to realize outside of ourselves the assemblage of positions constituting a surface;<sup>1</sup> but to a consciousness able to realize only one point in space, in addition to its own, the universe would appear to be a straight line; while

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<sup>1</sup> Not that we realize in one consciousness the whole surface; it is sufficient if we realize the elements of it, and the law of its generation.

to a consciousness able to realize a serial line of points, and no more, outside of itself, the universe would appear a plane; and possibly to a consciousness able to realize the aggregate of positions, in what we conceive as a solid, the universe would appear to be of four dimensions; and each of these orders of consciousness would realize the universe as we realize it as a related system. Furthermore, it is exactly the question in what sense, and to what extent, the schemata are to be regarded as products of evolution which forms the crux of mental philosophy. The schemata correspond to the work of intuition in the sphere of the imagination. And it might be said that as products of evolution in the domain of pure sensibility, they are, in reality, not only the means by which the categories represent an object, but also the very foundation of the categories themselves; and that therefore consciousness, in accordance with the view of the Associationist School, is to be looked upon as the ultimate and unanalysable unit of mind into which there has been built up, through ancestral experience, all that goes to make, not only man's experience, but also the experience of all animals possessed of mind. And it is noteworthy in this connection that it was the opinion of Hume that "belief is more probably an act of the sensitive than of the cogitative part of our nature."

## § 2. *Herbert Spencer's System of Philosophy.*

At this point we are brought into line with the philosophy of Herbert Spencer, which is popularly supposed to reconcile the Associationist with the Transcendental School, by referring to ancestral experience the *a priori* elements of Kant's system. But, though Spencer himself gives some colour to this opinion, by the way in which he regards mind, and by his method of dealing with mental manifestations, the opinion is nevertheless an erroneous one, as Spencer in developing his views is constrained to grant to mind elements which underlie all experience, whether personal or ancestral.

In order, however, to understand the essential matter of Spencer's doctrine, and to exhibit it side by side with that

of Kant, we must follow Kant a step further. Spencer treats of the root-properties of mind mainly as related to the operations of the external universe. He deals, to use Kant's terminology, not with the predicables of the pure understanding, but with the predicaments. And to compare his doctrine with that of Kant, we must introduce our readers to that section of Kant's *Analytic of Principles* which treats of corresponding matters, and in which we have given us the judgments with regard to the universe which the understanding really produces *a priori* in correspondence to the categories. These Kant divides into the axioms of intuition, of which the principle is that "all intuitions are extensive quantities"; the anticipations of perception depending on the principle that "in all phenomena the real, that which is an object of sensation, has intensive quantity, that is, has a degree"; the analogies of experience, the principle of which is that "experience is possible only through the representation of a necessary connection of perceptions"; and the postulates of empirical thought, in which the possible, real and necessary, are defined as related respectively to the formal, material, and universal conditions of experience. The principles here enumerated all fulfil Kant's criterion of necessity. And the judgments connected with them are obviously related to the primary and universal conditions of evolution, and not to the secondary laws of the processes of evolution which, however extended in their scope, pertain to that contingent sphere of which our experience takes cognisance. As, for instance, a little reflection will show, Kant's three analogies of experience—that substance is permanent, that changes are connected, and that co-existence implies correlation and reciprocity of action—sum up for us pretty much all that is known of the primary organization of the universe, and the manner of its persistence in the order of evolution. And if, then, in Spencer's system of philosophy we find that similar principles are assumed, and the like judgments postulated, as existing prior to all experience and necessary to experience, we shall have on the part of Spencer a substantial agreement with the position of Kant, with regard to the conditions under which experience is

possible, however otherwise he may differ from that philosopher in his view of the constitutive properties of mind.

From whatever point of view we regard the manifestations of mind, the principles on which we arrive at our predication of reality, and our conviction of an unalterable order of relations as determining our experiences, must be accounted for. And in Spencer's system these principles are deduced from the manifestations in consciousness of a power which he calls the Unknowable.

The manifestations of the unknowable he divides into two classes, the vivid and the faint. The vivid occur under the conditions of perception; and the faint, under the conditions of reflection, or memory, or imagination, or ideation. He assumes that consciousness is a competent judge of the likeness and unlikeness of its states; and he accounts for the objective and subjective, by referring to the former the judgment of the mind in reference to the vivid manifestations, and to the latter the judgment in reference to the faint.<sup>1</sup> Then, approaching the crucial question of the predication of reality, he defines reality to mean persistence in consciousness. And, after stating that the result must be the same to us, whether that which we perceive be the unknowable itself, or an effect invariably wrought on us by the unknowable, he proceeds to draw three conclusions.

"First, that we have an indefinite consciousness of an absolute reality transcending relations, which is produced by the absolute persistence in us of something which survives all changes of relation. Second, that we have a definite consciousness of relative reality, which unceasingly persists in us under one or other of its forms, and under each form so long as the conditions of presentation are fulfilled; and that the relative reality, being thus continuously persistent in us, is as real to us as would be the absolute reality, could it be immediately known. Third, that thought being possible only under relations, the relative reality can be conceived as such only in connection with an absolute reality; and the connection

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<sup>1</sup> We refer the reader, for criticism of these views, to Professor T. H. GREEN's Works, *Philosophical Works*, vol. i.; "Mr. Spencer on Subject and Object," § 26, etc.



between the two, being absolutely persistent in our consciousness, is real in the same sense as the terms it unites are real." (*First Principles*, § 48, p. 161.)

In other words, the first conclusion amounts to saying that we have an indefinite consciousness of the unknowable or some effect of the unknowable; the second, that we have a definite consciousness of relative reality in the object which, he explains in his *Psychology*, is the unknown permanent nexus, never itself a phenomenon, but that which holds phenomena together; and the third, that we only know the relative reality to be real because of our indefinite consciousness of the unknowable or of some effect of the unknowable.

These views practically amount to much the same as those which are expressed in Kant's *Analytic of Principles*, under the head of the "Refutation of Idealism." Kant there tells us:<sup>1</sup>

"All determination in regard to time presupposes the existence of *something permanent* in perception. But this permanent something cannot be something in me, for the very reason that my existence in time is itself determined by this permanent something. It follows that the perception of this permanent existence is possible only through a *thing* without me, and not through the mere *representation* of a thing without me." . . . And "that consciousness in time is necessarily connected also with the existence of things without me, inasmuch as the existence of these things is the condition of determination in time. That is to say, the consciousness of my own existence is at the same time an immediate consciousness of the existence of other things without me."

And in an explanatory note to the Preface of the Second Edition of his Critique, he further remarks:

"That the representation of something *permanent* in existence, is not the same thing as the *permanent representation*; for a representation may be very variable and changing—as all our representations, even that of matter, are—and yet refer to something permanent, which must therefore be distinct from all my representations, and external to me, the existence of which is necessarily included in

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<sup>1</sup> *Critique of Pure Reason*. J. M. D. MEIKLEJOHN'S translation p. 167.

the determination of my own existence, and with it constitutes *one* experience—an experience which would not even be possible internally, if it were not also at the same time, in part, external.”

Furthermore, it is the permanent something in perception which, according to Kant, demonstrates the objective reality of the categories. And from the metaphysical point of view the two philosophers, notwithstanding the almost opposite ways in which they look at the matter, are probably thus far in agreement. But when Spencer tells us that we have a definite consciousness of relative reality in the object, he makes no distinction between the object given in perception and the relations cogitated in experience, and ignores entirely the synthesis of perception which, according to Kant, goes to make experience. Or, perhaps more accurately, he regards as united in the unity of consciousness by one act, both the perception which gives a relation, and the experience which cogitates a related relation. And we must therefore take his doctrine of the predication of reality as definitive, not only of the real, but also of the single and unalterable order of relations which determines our experiences.

The relative reality persistent in us is, he tells us, the persistence of force. And its reality is vouched for, by no power of mind other than a vague consciousness “of an indefinitely-extended region of power or being, not merely separate from the current of faint manifestations constituting the *ego*, but lying beyond the current of vivid manifestations constituting the immediately-present portion of the *non-ego*.”<sup>1</sup> The force itself he defines as “that Absolute Force of which we are indefinitely conscious as the necessary correlative of the force we know”;<sup>2</sup> and says that by it is meant “the persistence of some cause which transcends our knowledge and conception.”

We fail to see, however, how, without an analysis of the constitutive properties of mind, this doctrine can be established. It may be due to our incapacity, but we are certainly unable to conceive of any “Absolute Force” as the correlative of the force we know. A man may think as Kant evidently did, that

<sup>1</sup> *First Principles*, § 46, p. 156.

<sup>2</sup> *Ibid.* § 62, p. 192d.

he has an intuition of something permanent in experience, or as Spencer phrases it, a consciousness of a region of power neither belonging to the *ego* nor to the immediately-present portion of the *non-ego*; and may cheat himself into the belief that this is the foundation of what is presented to his empirical consciousness, as Spencer does; but experience has to be accounted for in such a way that the reference to objectivity contained in every perception shall be satisfactorily explained, as it applies not only to the mind of man, but also to every order of manifestation of mind. An oyster has perceptive powers as well as man; but we cannot think it to have any consciousness whatsoever of something permanent in existence. Moreover consciousness, as Spencer allows, is a synthesis of differences; and not unless the state or activity which Spencer speaks of as an "indefinite consciousness" be of an entirely different kind and nature to our normal consciousness, can it be concerned with an unknowable which it would be a presumption to say is capable of presenting differences. Kant, indeed, tells us—and we cannot but think that in Kant's words we have a correct appreciation of what is contained in Spencer's doctrine of the persistence of force—"The conception of causality leads us to the conception of action; that of action to the conception of force." Again, he says, "Where action (consequently activity and force) exists, substance must exist." . . . "Action alone, as an empirical criterion, is a sufficient proof of the presence of substantiality, without any necessity on my part to discover the permanence of substance by a comparison."<sup>1</sup> But Kant is here explicitly looking, not at the sources of our synthetical cognition *a priori*, but at the analysis of it as applied to objects; not at *the conditions*, but *the content* of experience.

Because a principle is contained in experience, or suggested by experience as a necessary correlative to what we experience, it does not follow that it is the basis of experience. To be taken as the basis of experience, the principle must be demonstrated to be a condition of experience. And we are

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<sup>1</sup> *Analytic of Principles*, chap. ii. § iii. iii. B.

suspicious that the entire argumentation of Spencer is nothing more than a subtly-disguised presentation, as *a priori* truth, of the most general of those generalizations which have been painfully built up by the inductive method. Our generalizations with regard to the universe have been carried out to such a degree that we are able to say all things are known to us in terms of force, or, more correctly, of energy. And Spencer, ignoring the fact that force is, after all, a concept of the mind relating to matters of experience, appears to imagine that this most general of all generalizations can, by supposing it to be related to an absolute force, be spoken of as the basis of experience. Perhaps in a sense it is so, but only as referring to the content of our experience, not to the determining conditions by which we perceive and predicate objects as real.

Moreover, Spencer mixes up the real and metaphorical usages of the word force in a way which, however tolerable as a matter of literary style, is extremely vicious when introduced into matters where a strict terminology is of primary importance. He speaks of two kinds of force—"the force by which matter demonstrates itself to us as existing, and the force by which it demonstrates itself to us as acting." The first of these, he says, has no specific name; the second is known as energy, either potential or kinetic; these forces may, however, be in essence the same, though, to our perceptions, the second kind of force differs from the first kind in being not intrinsic but extrinsic. But what can Spencer mean by an intrinsic force which demonstrates matter to us as existing, if he be not metaphorically applying to the order of consciousness of relation a term true only of the order of changes of relation? If we take the term force in its accurate sense, the persistence of force can mean no more than the persistence of change, for forces manifest themselves only in changes; and, as applied to the order of mind, the persistence of change can have reference only to the persistence of representations in the sphere of intuition, and not to the reality of objects which is related to the anticipations of perception, not to the axiom of intuition. Reality is predicated not of the representations,

but of the synthesis of these in the act of thought. And if we take the term force to mean energy, as Spencer explains it, the persistence of force can only mean the persistence of the original organization of the universe; and, as applied to mind, the persistence of the original organization of the universe can only refer to a supposition that the consciousness of relations—that is the consciousness of the interdependent relations established in accordance with the physical law of the persistence of the original organization of the universe—is subject to some influence or action of the original organization itself, through which there is given to the mind both its predication of the reality of the object perceived and the conviction of its related nature. Such an influence or action might indeed, if it existed, be spoken of as the correlative of force or energy. But we only know of the original organization of the universe as the bond of the changes in the order of changes of relation. We formulate it as such to be the law of the physical universe, and conceive it as such to belong to the physical universe alone. And to assume it to have an influence or action on the sphere of the consciousness of relations, is manifestly to intrude into the order of consciousness the order of change.

This introduces us to a consideration which is fatal to Spencer's views. Spencer applies ideas and terms derived from the sphere of changes of relation to explain matters pertaining solely to the sphere of the consciousness of relations. Energy and mind are the ultimate facts of the order of evolution. The persistence of the original organization of the universe is connected with the former; the predication of reality, and the conviction of an unalterable order of relations as determining our experiences, are connected with the latter. But what are judged by the mind to be real are not forces, nor yet the correlatives of force, but relations; and that which gives ground to the judgment must be conceived of in terms of relations, and not of force or energy, otherwise we intrude the material into the sphere of the spiritual, and practically beg the question of the derivative nature of mind. And though Spencer himself waxes eloquent when



repudiating the charge of materialism, and bids us see "that though the relation of subject and object renders necessary to us these antithetical conceptions of Spirit and Matter, the one is, no less than the other, to be regarded as but a sign of the Unknown Reality which underlies both"; yet his absorption in the objective side of the mental life is so conspicuous, and his neglect of the subjective side so pronounced, that the practical issue of his philosophy is materialism if anything. He goes outside of mind to explain what is contained in mind; and applies dynamical ideas, not with the most rigid exactitude, to explain what has nothing whatever to do with dynamics, namely, perceptivities of relations in the sphere of the consciousness of relations. And whatever merit is contained in his recognition of mind, he destroys by giving to mind such a material garb that its activities may be mistaken for mechanical activities without the suspicion of illusion.

So far we have criticised Spencer's views on the side on which they harmonise with the system of Kant, and make admissions which are fatal to the views of the Associationist School. Spencer, however, endeavours to combine into a composite photograph both Kant and Hume. And in his account of the evolution of the *a priori* cognitions of the mind, he distinctly approximates to the Associationist views. Space, time, and all that is contained in the *a priori* conceptions of the mind he resolves into derivative forms of the persistence of force. Space is the abstract of all co-existences; and our consciousness of space has been elaborated parallel with the evolution of intelligence from experiences of force variously correlated. Time, in like manner, from the perception that different resisting positions are capable of being perceived only in one order, has been evolved as the abstract of all sequences. Our idea of matter is "that of co-existing positions that offer resistance"; and of motion, that of "a something that moves, a series of positions occupied in succession, and a group of co-existing positions united in thought with the successive ones." And from these as foundation principles he further proceeds to

develop, as necessary truths and corollaries of the persistence of force, the indestructibility of matter, the continuity of motion, and other conceptions, such as those defined in Newton's Three Laws of Motion, which are commonly regarded as generalizations of the inductive order. These, he tells us, in common with space, time, matter, and motion, are not necessary truths "as implying cognitions wholly independent of experience, but as implying cognitions that have been rendered organic by immense accumulations of experiences, received partly by the individual, but mainly by all ancestral individuals, whose nervous organization he inherits."<sup>1</sup>

It is doubtful, however, whether we have in this doctrine a view of the intuitions and *a priori* judgments of the mind other than as they apply to the widening of experience. The explanation given of the formation of the abstract of space, for instance, proceeds on the hypothesis of experiences of force variously correlated, that is presumably on the hypothesis of ready-made experiences of contingent operations in the order of evolution, and not on an hypothesis of affection by the necessary conditions of evolution, in which alone are found the characteristics corresponding to the necessary and universal elements which go to make experience. And beyond question, Newton's Second Law of Motion, that change of motion is proportional to the moving force impressed, is a secondary law pertaining to the order of change, and therefore altogether of a contingent nature. What Spencer accounts for are our developed abstracts of space, time, matter, and so forth, as resulting from experiences of force.<sup>2</sup> The question of how far we have original intuitions or conceptions corresponding to them, he evades by considering only the objective aspect of the matter. And the real bearing of his position may, perhaps, be best shown by bringing into line

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<sup>1</sup> *First Principles*, p. 179, note.

<sup>2</sup> In making this statement we do not, of course, assent to Spencer's view of the manner of their evolution. Nor do we imply our assent to the opinion that such truths as Newton's Laws of Motion are capable of becoming organic cognitions. These can only become organic if Spencer's law of direct adaptation and the inheritance of acquired characters be truths, which they are not.

with his deductions the views of Kant. Space and time, says Spencer, are derivatives in experience from the persistence of force. Possibly they are such as pertaining to our developed conceptions of space and time; but space and time, or something corresponding to them, are, says Kant, the *a priori* forms under which sensation takes place; space is the form of the external sense, the subjective condition of the sensibility under which alone external intuition is possible; and time "is the form of the internal sense; that is, of the intuition of self, and of our internal state." This intuition of self is connected in Kant's system, indeed, with the something permanent in perception; but without the intuition of self there could not be any perception whatever; and so time, or something which performed the same office as the developed conception of time does for us, must have been present in the earliest manifestations of mind. And the same may be said of space, the form of the external sense, without something corresponding to which, indeed, we could not know the something permanent to be external to us. But if the persistence of force be an equivalent for the something permanent in perception of Kant, we must, according to Spencer's exposition of the matter, conclude that forms of nervous organization exist in which, though all definite form of either the internal or external sense is absent, the persistence of force is present; and hence that possibly the jelly-fish, which has no consciousness of anything in the world in which it lives, has yet the indefinite consciousness of the unknowable.

### § 3. *The Possible Views of the Problem.*

Taking the categories of Kant to correspond to the elements of thought, which go to make experience possible, we may view the action of the mind under four aspects—that of a unifying action in sensibility predicable of the form of our representations, that of a unifying action in perception predicable of the content of our representations, that of a unifying action in experience predicable of the relations of perceptions, and finally that of the objective exercise of these

functions in the consciousness of an object in conformity with the schematism of the understanding. Further, our cognition of objects constitutes the sphere of external experience; and in experience, objects are cognised to be relations bound together into a unified system of interdependent relations by the law of the physical order of evolution. Hence bringing into one view the conditions of human experience, and the facts of experience, we find subjectively a unifying action of mind, and objectively a unified system of relations; and, regarding these as belonging respectively to the mind and the not-mind, the problem before us is to account for the connection between them as a fact of evolution. The mind unifies. External relations are a unified system. And, rejecting the idealistic view that the existence of objects without us is either doubtful or illusory, as opposed to the doctrine of evolution which manifestly entails the conception of a something evolved, there are three views which may be taken of the connection between the mind and the not-mind.

First, recognising that in our conception of the order of evolution there is included the conception of a time when mind, as we know it, was non-existent; and that before mind dawned on the universe the physical evolution had reached a comparatively advanced stage, and the protoplasmic risen to a certain order of adaptation; it may be held that, as mind appears a birth in time under physical and protoplasmic conditions, mental manifestations are a resultant of these conditions.

Second, we may regard mind to be distinct from matter, but both equally to be forms or faces of the same thing. This is the view of Herbert Spencer.

Third, we may hold mind and matter to be distinct; and, regarding the unifying action of mind as independent in its origin of the unified system of the universe, conclude both to be ultimate facts equally independent of the order of evolution.

From the point of view of evolution there can be no other views than these, which respectively regard the root properties of mind as resultants of matter, as derived from the same conditions as matter, and as independent both of matter and of the material order.

The first of these views has, however, been sufficiently discussed in the body of this work, and may here without hesitation be set aside as indisputably false.

We have also more than once in the body of this work incidentally touched upon the characteristics of Spencer's System, and adversely criticised, from the scientific standpoint, his speculative views of the order of evolution. And we have, furthermore, in this appendix examined in relation to the system of Kant the view which Spencer takes of mind, and found that by applying physical ideas to mental facts, he practically begs the question at issue. There is a view of facts, however, presented by Professor Th. Ribot in his work on *Heredity* which might be thought to afford a rational basis for the construction of Spencer's system. And to this we shall give a brief examination, more especially as M. Ribot explicitly deduces from it a view of mind and matter not dissimilar to the view of Spencer.

Conscious life, says M. Ribot,<sup>1</sup> appears to grow insensibly out of unconscious life. In reflex action the simplest adjustment of a nerve-centre, acting automatically, gives a regular and co-ordinated connection between the excitation and the contraction; and, ascending to the more complex nerve-centres, the same automatic action is met with. The regulation of the bodily functions of digestion, nutrition, and respiration is not under the control of consciousness; and the exercise of these functions is only dimly and obscurely known. Instinct is an unconscious mode of intelligence; and instincts are only habits fixed by heredity. Certain states, such as somnambulism and hypnotism, show that even the higher actions of the brain may be performed without consciousness; and the genius and the artist arrive unconsciously at their highest conceptions. Moreover, sensation can be analysed; the velocity of thought can be measured; personality is only a synthesis; and our consciousness is but a small part of what passes within us.

These facts, if truly stated, afford evidence that an activity which is dependent on physical conditions, or an analogue of

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<sup>1</sup> *Heredity*, part iii. c. i.



physical conditions, and in which consciousness is but a minor factor, if a factor at all, prevails in all mental manifestations, the simplest as well as the most complex. A little reflection, however, will show that much is here fathered on the mental that is non-mental, and that with regard to what is mental an exaggerated value is given to some facts, while other facts are left entirely out of sight.

If conscious life grow out of unconscious life, and they be but phenomena of the same order, how does the distinction arise between purposeful and purposeless acts? To say that the purposeful act presupposes a prior and purposeless occurrence of the same act to supply the idea of the act, is no explanation of the subsequent dependence of the act on the idea of it. Again, nothing is mental which is unfelt, or of which a being is unconscious. And the automatic action of the brain, whether as manifested in reflex actions or in the states of somnambulism or hypnotism, while it tells us what consciousness is not, in no way informs us what consciousness is; and if the genius and the artist arrive unconsciously at their highest conceptions, this proves nothing more than that mind is not generally conscious of the processes involved in its own acts. The real problem is not how much the brain can do without the action of mind, or how the genius or the artist—or even the humblest intellect—arrives at particular conceptions, but that there should be such a thing as the mind, and that it should have conceptions at all. Further, in the matter of instincts, while some are merely habits fixed by heredity, and, as such, belong exclusively to the protoplasmic order, others involve the exercise of intelligence, and belong as exclusively to the order of mind; and the unconsciousness which is characteristic of the former class stands in no necessary relation whatever to the intelligence manifested in the other. Finally, when it is said that sensation can be analysed and the velocity of thought measured, all that is meant is that the physical conditions necessary to them can be determined. The instrument to reveal how thoughts arise has yet to be invented; and though the time to give a response to a stimulus requiring an operation of thought can be roughly

estimated, we can in no way conceive the physical antecedents of a thought to produce, either by themselves or by the continuation of their effects, the thought itself. Thought pertains to the order of the consciousness of relations, and not to the order of changes of relation; and the conclusion is obvious that the view of facts before us never once enters into the arcanum of mind, but busies itself solely with the material conditions necessary to the manifestation of mind.

From the *a posteriori* ground, however, which we have here set forth and reviewed, M. Ribot soars to the region of philosophy, and tells us—

“The physical is the moral [*i.e.* the mental] looked at from without, and the moral is the physical looked at from within. The difference between the physical and moral is subjective, not objective; it pertains not to their own nature, but to our way of viewing them. Physics has demonstrated that heat, light, and sound appear to us as different, only because each of them is addressed to a different sense, so that all the difference comes from ourselves. The psychologist ought to see that the physical and the moral appear different to us, only because the one is cognised by the external senses, and under the conditions of time and space, and the other by the internal sense, under the condition of time; so that all the difference comes from ourselves. Thus the absolute, under its unconditioned form, would be entirely beyond our reach, and the conditioned forms in which it is manifested to us in experience would be opposites only by an illusion of our thought.

“Perhaps we might proceed further, and draw an important deduction. If we admit the identity of physical and moral phenomena; if we observe that all that is in the living being forms a continuous series, from perfect unconsciousness, if there be such a thing, to perfect consciousness, if, again, there be such a thing; if it be borne in mind that the unconscious is the abyss into which everything enters and from which everything proceeds, the very root of all our mental life, and that our personality is like a wandering light on a vast and sombre lake, where it appears as though swallowed up each moment; then, perhaps, we shall be inclined to admit that the physical order and the moral order, which in our consciousness appear to be different things, are identical in the unconscious; that conscious duality is derived from an uncon-

scious unity, so that in the unconscious, matter and thought, object and subject, external and internal, are one."

But if the difference between the physical and the mental be subjective, and not objective, how comes it that the mind, without which there can be no conception of either, is under the illusion that they differ? To say that the illusion is due to a difference of cognition, is to stop short at the very threshold of the difficulty. To be certified of the illusion, we ought to know how the two unlike forms of sense cause our cognitions to differ. Some one, for instance, with the fixed idea that the earth was flat, might say that when we see a ship disappear below the horizon, first the hull and then the masts, we are labouring under an optical illusion; but unless he showed precisely how the phenomena of light account for the illusion, or adduced analogies apposite to the case from other illusions, he could not advance one step in his argument beyond mere logomachy.

If we turn back to M. Ribot's statements, we find that he asserts that the physical abstracted from our consciousness of it manifests no difference at all; and this we presume is to be taken as a ground of analogy for the further statement that the mental and the physical are, in the unconscious (whatever that may mean), one. But the analogy does not hold to that precise degree of closeness which is necessary to constitute it a valid argument. The resemblance in each case lies in a relation of things to "ourselves," in which the things, which in one case are the same, are judged to be dissimilars. And for the analogy to be sound, the "ourselves" that is under an illusion in the one case, must be the same as the "ourselves" that is inferred analogically to be under an illusion in the other. But the "ourselves" to which M. Ribot refers the difference between the mental and the physical, is the mind in its aspect of sensibility to what is external and internal; while the "ourselves" to which he refers the differences between the physical (such as those of light, heat, and sound) is the mind in co-ordination with the avenues of sense. And these are not the same. Moreover the proposition, on the

truth of which the analogous inference is made, is itself not true. It is not true that "light, heat, and sound appear to us different, only because each of them is addressed to a different sense." The very fact that they are addressed to different organs of sense is a proof in itself that they are not the same. The mind is not the direct cause of the organs of sense. The organs of sense are protoplasmic adaptations to the external relations of the physical order; and the difference between the crystalline lens of the human eye and the cochlea of the human ear, are proofs sufficient that light and sound, at any rate, are not the same. The only sense in which light and sound can be said to be the same is that both are modes of motion and forms of energy. But to assert from this their identity is to confuse the relations of the physical order with the bond of physical relations, and to merge the interdependent organizations of the physical universe into the original organization of the universe. And on this view physical processes, equally with mental manifestations, come to have no meaning. If mind is robbed of all significance, so also is matter. And if our personality is "like a wandering light on a vast and sombre lake, where it appears as though swallowed up each moment," evolution itself is like the fitful billows on its surface.

The doctrine of an unknowable or absolute, to which all reality must be referred, and of which mind and matter are antithetical conceptions, leads to a scepticism with regard to the power and place of mind which ought to be extended to the whole system of evolution. It admits of disproof, therefore, as a case of *reductio ad absurdum*. Moreover, it is founded upon a distinction between phenomena and things-in-themselves, the tenableness of which we make bold to question.

A close analogy undoubtedly exists between the orders of matter and mind. Matter is an order which is conceived of as obtaining in space; mind is an order conceived of as obtaining in time. The phenomena of matter are relations in space; the manifestations of mind are cognitions of relations in time. The order of evolution of matter admits

of interpretation as a continuous process of integration, in which definite interdependent relations are established in accordance with the law of the persistence of the original organization of the universe; and the order of evolution of mind also admits of interpretation as a continuous process of integration, in which definite cognitions of relations are established in accordance with the canons of the real and the related. Further, the process which takes place in matter, though conceivable as a process of change, is nevertheless a hidden process, observable only in its effects; and the process that takes place in mind is also a hidden process of which we are unconscious. Moreover, the process in mind is connected with the process in matter. Were all change to cease in the physical universe, then, though it would be a system of relations, all cognition of these relations would be at an end. The process in matter is a condition of the process in mind; and mind is affected not by matter, but by the processes that take place in matter. So far we trace the analogies and connection between mind and matter. But yet no attempt to prove that they are different faces of the same thing is able to set aside the fact that the predication of reality and the conviction of an unalterable order of relations as determining its experiences, though analogous to the persistence of the original organization of the universe in the order of matter, are inseparable from the order of mind. And all speculations which attempt to refer the real to a supposed thing-in-itself apart from the mind, err in transferring from the mind that which is peculiar to mind.

The transference of the real from the judgment of the mind to something external to the mind, arises mainly from a confusion of the real as a predicable of the mind with the true as prevailing in our conceptions of objective fact. We form, from the evidence of our senses, erroneous judgments of things which we correct by counter-evidence; and these illusions of sense are taken to be illusions with regard to the real, whereas they are really illusions with regard to the truthfulness of our conceptions. I press with my finger a corner of my eye, and there arises a mistaken perception of



light; the light, however, is a reality to the mind, and implies no contrast between the phenomenal and the real, but between a false and a true perception. Again dreams and hallucinations are realities to the mind, and are taken as true until they are proved to be otherwise; and in the case of persistent illusions, such as that the moon at rising or setting appears much larger than when high in the sky, the mind continues to predicate reality of the appearance, though it knows that it is not in correspondence with the objective fact.

Again, the evidence of our senses carries us but a little way into the apprehension of what is contained in the universe; and the revelations made by the application of the methods of science to the universe give further support to the distinction our illusions of sense incline us to make between the phenomenal and the real. We resolve the complex phenomena of the universe into simpler, and arrive at the ultimate fact that all is motion, and at the ultimate process that all is change of motion; and we contrast the definite relations of matter as they present themselves to consciousness with the motions, vibratory or otherwise, into which we have resolved them. The former we speak of as the phenomenal, the latter as the real. And not content even with this, realizing the limitations of our scientific faculty and our ignorance of the ultimate nature of the process of evolution, we proceed to set up over against the system of the universe we have constructed an unknowable real to which even motion is a phenomenon. Here our error throughout has been a two-fold error. First, we have transferred, as before, the signification of the term real as it applies to the judgment of the mind in the predication of reality to something outside of the mind, in which we look for that apodictical truth we imagine to be absent from our experiences of the contingent. And second, we have contrasted our conceptions of the definite relations of matter as presented to consciousness with our scientific conception of these same relations as related to the processes of evolution; and so have ascribed to the phenomenal and the real a difference which is in fact due to two different modes of conception.

Even Kant was not free from these errors. And when he tells

us that the senses represent objects as they appear, the understanding objects as they are in the connection of phenomena, but that objects as objects of the pure understanding must ever remain unknown to us, he is led astray from his own system of philosophy by an assumed opposition between the real and the work of thought. He tells us we live in an island surrounded by a wide and stormy ocean, the region of illusion, where many a fog-bank, many an iceberg, seem to the mariner on his voyage of discovery a new land. But this is a nursery tale and a mere creation of the fancy. And the mariner whom he pictures as deluded with vain hopes and engaged in dangerous adventures from which he can never desist, and which he can never bring to a termination, is deluded only because he is for ever seeking the enchanted castle he has conjured up for himself in the shape of the thing-in-itself. Where there are fog-banks there is land; and over the seas where icebergs float there are coasts from which the icebergs come. And if we seek not for enchanted castles, but the true land, with patience we shall find it. The mind may be a captive in the caves of sense, and see of passing things only the shadows on the wall. But the shadows are no dream. And we should have thought that the remarkable achievement of Newton in arriving at the law of gravitation by the construction of geometrical figures in space would have been sufficient to preserve a mathematician like Kant from the error of supposing that, in the symbolical representation of the outer world in the sphere of intuition, there was involved a correspondence to nothing more than mere appearances. The unifying power of mind, and its predication of relations as real and as related, are no shadows but the truth. The mind may exert its unifying power only in accordance with the conditions under which it perceives; and its conception of relations is probably only symbolical; but yet at the same time its knowledge is of the truth. The world is the intelligible; and from the point of view of their intelligibility we have a true knowledge of things.

That the order of mind contains a principle as ultimate as the principle contained in matter, and that the *a priori*

elements, which go to make experience possible, are as little the product of evolution as the original organisation of the universe, may, moreover, be inferred from the general consideration of the order of evolution. In every order of evolution there are, relatively to the process of the evolution, two ultimate facts—the root-properties of the order which are, so to speak, the material of the evolution, and the law of the evolution which takes place with regard to these root-properties. The law without the material is empty: the material without the law is barren; and, though the root-properties in any order may be the product of a previous order of evolution, without their distinctive properties relatively to their own order, there can be no evolution of that order. In the order of matter we recognise the root-properties of the atom and the molecule; and if we resolve these root-properties into the unchanging constant of the physical universe, it is simply because the sphere of the root-properties is also the sphere of the law of the evolution. Again, in the order of life we have the root-properties of assimilation, reproduction, and the power of movement; and, though we find the law of the evolution to be external to life, and to reside in the fact of the physical order, all changes which take place in the protoplasmic world are changes which take place within the limits of these root-properties. The law of the evolution is limitative of the adaptations, not of the changes; and in all adaptations of life two things are brought into relation—the root-properties of life on the one side, and the order of the physical universe on the other. Similarly in the order of mind, the evolution of the manifestations of mind presupposes, in addition to the law or laws of their evolution, certain root-properties which are evolved; and, without dwelling on the higher manifestations of mind, and the significance of the law of their evolution, it is quite sufficient for us to take account of the manifestations of mind evolved under the law of the protoplasmic evolution, to discern that the very fact of their evolution implies that the mind possesses, as root-properties, all that goes to make experience possible. The broad lines of the relation of mental manifestations to the proto-

plasmic order, in which mind is first a factor conservative of life, and next a factor protective of the individual and formative of internal bonds of union, are sufficient to demonstrate that, while the physical order continues to be the law regulative of life, the mental order is the internal condition under which the law is operative in a new order of relations. Only when we couple with the fact of the physical order the fact of an order of consciousness of relations, have we the necessary basis of the order of evolution, in which pleasures and pains become operative in life, and the pleasurable feeling of existence arises to emphasize the position of the individual, and direct the protoplasmic law to the evolution of internal bonds of union. We cannot separate sensibility from mind, and suppose that, while all nerve activity is accompanied by the element of sensibility, the other factors in mind have been derived from the same source as are the properties of matter; for then an animal could not know of its states, and could have no feeling of pain. Its sensibility would act merely as a mechanical attribute of its nervous organisation, and the world of mind would be a mere register of the empirical associations of the nervous system. And even if such were capable of explaining mind in the lower animals, as it exists in any particular animal, it is difficult to conceive how empirical associations could be transmitted by heredity, without accepting the speculative views of Spencer, and holding them to be governed by the law of direct adaptation, the effects of use and disuse, and the inheritance of acquired characters, all of which laws are speculative, and none are true. If, on the scientific hypothesis, a brain were transmitted by natural selection congenitally adapted to empirical associations, all nervous reactions consequent on such adaptations would be persistent throughout the life of the individual; but this, except in such reflex habits as those of the clucking hen, is not the case. And some such laws as Spencer's are therefore necessary to the views of the Associationist School. But if these laws be true, how is it that the feet and hands of man, the proportions of his limbs and their muscular adjustments, have all become adapted to the

adoption of the upright position, while his brain has lagged behind. That is, how it is that the very element which was most in touch with the external order, and most exercised in acquiring the associations necessary to walk and use the hands, has passed on least the effects of use. How was this? And why was the indirect means of babyhood laid hold of and extended, involving as it did the supplementary conditions of increased care on the part of the parents, and of the consequent withdrawal of the energies of life from the direct struggle for existence to the preparation of the offspring for that struggle, if the law of direct adaptation and the inheritance of acquired characters prevailed? Granted that old associations had to be got rid of, was the same not true of the muscular and structural adjustments of the feet, hands, and vertebral column? The canon of evolution that recently-acquired characters are the least stable cannot apply here; for the limbs are as old as the nerves that control them, and yet they have become rigorously adapted to the upright position, while the nervous and muscular systems still preserve traces of old adjustments in the elements which make a baby clutch with its hands and turn its toes inwards.

The manifestations of mind are dependent on the physical order in respect of adaptation to the sphere in which the relations to be perceived exist. But at the same time, by virtue of its unifying power, and its predication of relations as real and as related, mind is independent of the physical order. And we recognise in the order of evolution two ultimate facts, a unifying principle in mind, and a unified system outside of the mind. The unity of the system outside of mind is immanent in the universe, and is not the product of the evolution processes. And the unifying principle in mind is also immanent in mind, and must be similarly concluded not to be a product of evolution. All that takes place in the order of evolution with regard to mind is that through the adaptations of the nervous system, and through the influence of the social bond, extended means are acquired of perceiving relations. In the physical and protoplasmic orders of evolution, the order of evolution presupposes the unity of the



physical order. And in the order of mind there is equally presupposed the unifying principle in mind.

§ 4. *The Significance of the Ultimate Truths of the Order of Evolution.*

A further question arises with regard to the significance of the ultimate truths at which we have arrived. The unity of the physical universe is immanent in the universe, and independent of the order of evolution; every change of relation conserves the original organization of the universe; and when change began, it began in a unified system. Also the unifying principle in mind is native to mind, and not derived from anything in the order of evolution; in all experience the unifying power of mind is present; and when experience began, it began in a mind which implicitly trusted in its perceptions as real, and as pertaining to an unalterable order of relations. These are the ultimate truths of the order of evolution; and we may well ask ourselves, what is their significance?

We owe to Kant the clear apprehension of the part played by mind in perception, says Professor Green. But when Kant turned to the consideration of our ability to arrive at a complete unification of our knowledge, he found no answer except in four antinomies, which express the inability of the reason to raise a conception above the empirical, and yet preserve its connection with it. Kant reasoned, however, not from ultimate truths, but from cosmological conceptions derived from his categories. And the question of the significance of the mind that unifies, and the universe that is a unified system, is altogether different to the puzzle of the time and space limits of the world, the mystery of an indivisible unity somewhere in the world, the problem of its cause, and the enigma of the conditioned and unconditioned. We seek for the ground of connection, and not for the key to a mystery. We argue not from the formal conditions of a possible experience, but from the ultimate truths of our experience. And these truths fulfil all the canons which Kant himself lays down for the

construction of a valid argument. They are more than the formal conditions of a possible experience; they are immanent in the field of experience; they are themselves the conditions of the conditioned; and by the elimination of the self-contradictory hypotheses, we may be assured of the truth which accounts for their connection.

And we cannot interpret the significance of these truths better than has already been done by Professor Green—<sup>1</sup>

“The question how it is that the order of Nature answers to our conception of it, or, as it is sometimes put, the question whether Nature really has, or having, will continue to have, the uniformity which belongs to it in our conception, is answered by the recognition of the fact that our conception of an order of Nature and the relations which form that order, have a common spiritual source. The uniformity of Nature does not mean that its constituents are everywhere the same, but that they are everywhere related; not that ‘the thing which has been is that which shall be,’ but that whatever occurs is determined by relation to all that has occurred, and contributes to determine all that will occur. If Nature means a system of objects of possible experience, such uniformity necessarily arises in it from the action of the same principle which is implied in there being any relation between the objects of experience at all.”

Professor Green, we may further remark, accounts thus for Kant’s error—

“That Kant should not have seen this merely goes to show that his own doctrine, being the gradual conquest of his later years, had not obtained full possession of his mind. The antithesis between the real and the work of thought had still such command over him that, after he had himself traced the agency of thought in all that gives the world of experience a definite character, he still could not help ascribing to this world, in terms of the knowable, a relation to an unknowable opposite; though that very relation, if it existed, would, according to his own showing, bring the unknowable opposite within that world (dependent on an intelligent subject) from which it is expressly excluded.”<sup>2</sup>

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<sup>1</sup> *Prolegomena to Ethics*, § 33.

<sup>2</sup> *Ibid.* p. 44.

The only conclusion which is not self-contradictory, says Professor Green, is that the Eternal Self-Consciousness, which is the cause of the unity of the cosmos, is realized in a more or less partial manner in every percipient mind.

And this philosophical conclusion, it will be observed, substantially agrees, as far as it goes, with the conclusion which we have arrived at, in the body of this work, from the evidence of the law of sympathetic relationship. Man reflects the Divine Essence. But having said this, we can say no more. As a philosophical conclusion it carries with it, as conceived of by Professor Green, certain corollaries which we cannot accept. There is contained in it no specific ascription of Personality or Attributes, neither is there implied in it any conclusion with regard to the ultimate destiny of mankind. In its bare form it might equally well be believed in by the Buddhist, whose highest ideal is absorption into "Nirvana," the Positivist who believes in humanity, and the Christian who trusts in God. Moreover there is probably implied in it a definite conclusion with regard to all manifestations of mind lower than that of the mind of man. Professor Green appears to regard an animal as an automaton, and to limit the realization of the self-conscious principle to man. These and other considerations forbid us to rest in it, either as final, or as a full and sufficient exposition of the relations of conscious life to the Eternal. It yields us ground for combating extreme materialism, or the modified materialism of Spencer, which we may call dynamism; but it does not give a sure resting-place to the wearied wings of the perplexed soul.

Professor Green's philosophical conclusion is too limited in its applications, and too barren in its results. The mind undoubtedly being a consciousness of relations, and lying, equally with the original organization of the universe, behind evolution, predicates consciousness to be an element in the origin of things, but we have no right to assume that the testimony of the nature of mind is final with regard to the Attributes of God, and that nothing more can be predicated concerning Him than that He is Eternal Self-Consciousness. Mind, in itself,

bears a certain witness to God ; but it must not assume itself privileged to rule out of court the further testimony of its manifestations with regard to the Purpose of God.

And the testimony of the manifestations of mind to the Purpose of God, we may add, is the best corrective of the monism which looks backward, and seeks to resolve all things into a single principle. It teaches us that a truer monism is to be found in looking forward ; a monism which not only unifies, but which also gives, what the prevalent monistic doctrine does not do, a meaning to the course of evolution ; a monism which tells us that God will be one with His universe, and His universe one with Him, that the spiritual in the material shall glorify the universe, and the material in the spiritual make manifest the Divine ; a monism which finds its adequate expression only in the Christian doctrine of the Incarnation.

FINIS.





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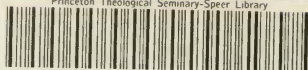
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